CONSANGUINEOUS MARRIAGES

IN THE

AMERICAN POPULATION

BY

GEORGE B. LOUIS ARNER, A. M.

University Fellow in Sociology

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY
IN THE
FACULTY OF POLITICAL SCIENCE
COLUMBIA UNIVERSITY

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PREFACE

THIS monograph does not claim to treat exhaustively, nor to offer a final solution of all the problems which have been connected with the marriage of kin. The time has not yet come for a final work on the subject, for the systematic collection of the necessary statistics, which can only be done by governmental authority, has never been attempted. The statistics which have been gathered, and which are presented in the following pages, are fragmentary, and usually bear upon single phases of the subject, but taken together they enable us better to understand many points which have long been in dispute.

The need for statistics of the frequency of occurrence of consanguineous marriages has been strongly felt by many far-sighted men. G. H. Darwin and A. H. Huth have tried unsuccessfully to have the subject investigated by the British Census, and Dr. A. G. Bell has recently urged that the United States Census make such an investigation.[1] Another motive for undertaking this present work, aside from the desire to study the problems already referred to, has been to test the widely prevalent theory that consanguinity is a factor in the determination of sex, the sole basis of which seems to be the Prussian birth statistics of Düsing, which are open to other interpretations.

The stock illustrations from isolated communities have been omitted as too difficult to verify, and little space has

[1] *Cf.* Bell, "A Few Thoughts Concerning Eugenics." In *National Geographic Magazine*, March, 1908.

been given to the results of the inbreeding of domestic animals, for although such results are of great value to Biology, they are not necessarily applicable to the human race.

The writer regrets that it is impossible here to acknowledge all his obligations to those who have assisted him in the preparation of this work. Such acknowledgement is due to the many genealogists and other friends who have kindly furnished detailed cases of consanguineous marriage. For more general data the writer is especially indebted to Dr. Alexander Graham Bell, to Dr. Martin W. Barr, to Professor William H. Brewer of Yale University, and to Dr. Lee W. Dean of the University of Iowa. In the preparation of the manuscript the suggestions and criticisms of Professors Franklin H. Giddings and Henry L. Moore have been invaluable.

G. B. L. A.

MARCH, 1908.

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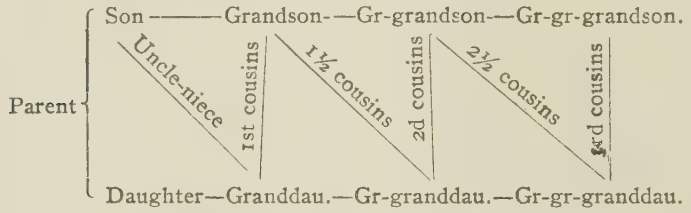
CHAPTER I

Introduction

The purpose of this essay is to present in a concise form and without bias or prejudice, the most important facts in regard to consanguineous marriages, their effects upon society, and more particularly their bearing upon American social evolution. The problems to be considered are not only those which relate primarily to the individual and secondarily to the race, such as the supposed effect of blood relationship in the parents upon the health and condition of the offspring; but also the effect, if any, which such marriages have upon the birth-rate, upon the proportion of the sexes at birth, and the most fundamental problem of all, the relative frequency with which consanguineous marriages take place in a given community.

No thorough and systematic study of the subject has ever been made, and could not be made except through the agency of the census. The statistical material here brought together is fragmentary and not entirely satisfactory, but it is sufficient upon which to base some generalizations of scientific value. The sources of these data are largely American. Little attempt is made to study European material, or to discuss phases of the problem which are only of local concern. Some topics, therefore, which have frequently been treated in connection with the general subject of consanguineous marriages are here ignored as having no scientific interest, as for instance that of the so-called "marriages of affinity," which has been so warmly debated for the past fifty years in the British Parliament.

For obvious reasons it will often be impossible to distinguish between the different degrees of consanguinity, but wherever possible the degree will be specified. It is probable that where a number of marriages are vaguely given as consanguineous, few are more distant than second cousins, for in the United States especially, distant relationships are rarely traced except by genealogists. In designating degrees of relationship the common terminology will be used, as in the following table, expressing, however, the rather clumsy expression, "first cousin once removed" by the simpler form "1½ cousin."



By far the greater part of the literature of consanguineous marriage is of a controversial rather than of a scientific nature, and a search for statistical evidence for either side of the discussion reveals surprisingly little that is worthy of the name. Yet men of high scientific standing have repeatedly made most dogmatic assertions in regard to the results of such unions, and have apparently assumed that no proof was necessary. For example, Sir Henry Sumner Maine "cannot see why the men who discovered the use of fire, and selected the wild forms of certain animals for domestication and of vegetables for cultivation, should not find out that children of unsound constitution were born of nearly related parents." [1]

[1] Maine, *Early Law and Custom*, p. 228.

Much space is given to the alleged "innate horror of incest," and frequent appeals are made to Scripture, wrongly assuming that the marriage of cousins is prohibited in the Mosaic Law.

The origin of "prohibited degrees" is only conjectural. The Christian Church apparently borrowed its prohibitory canons from the Roman Law,[1] and a dispensation is still necessary before a Catholic can marry his first cousin. However, such dispensations have always been easy to obtain, especially by royal families, and even the marriage of uncle and niece sometimes occurs, as among the Spanish Habsburgs, and as recently as 1889 in the House of Savoy.

The prohibition of the marriage of first cousins was removed in England by the Marriage Act of 1540,[2] but by this time the idea of the harmfulness of kinship marriage was so thoroughly impressed upon the people that they were very prone to look askance at such unions, and if they were followed by any defective progeny, the fact would be noted, and looked upon as a chastisement visited upon the parents for their sin. Naturally the idea became proverbial, and in some places it has influenced the civil law.

Perhaps the first printed discussion of the subject in America is from the pen of Noah Webster, in an essay which should be as interesting to the spelling reformer as to the sociologist.[3] He writes: "It iz no crime for brothers and sisters to intermarry, except the fatal consequences to society; for were it generally practised, men would become a race of pigmies. It iz no crime for brothers' and sisters'

[1] Luckock, *History of Marriage*, p. 282.

[2] Child, "On Marriages of Consanguinity," in *Medico-Chirurgical Review*, April, 1862, p. 469.

[3] Webster, *Collection of Essays and Fugitiv Writings on Moral, Historical, Political and Religious Subjects*, 1790, p. 322.

children to intermarry, and this iz often practised; but such near blood connections often produce imperfect children. The common peeple hav hence drawn an argument to proov such connections criminal; considering weakness, sickness and deformity in the offspring az judgements upon the parents. Superstition iz often awake when reezon iz asleep."

From about 1855 to 1880 much was written about the effect of consanguineal interbreeding. One of the first contributions came from America. In 1858 Dr. S. M. Bemiss, of Louisville, Kentucky, reported to the American Medical Association the results of his investigation of 833 cases of consanguineous marriage.[1] His compilation remains to this day the largest single piece of direct statistical work on the subject. Unfortunately, however, his statistics have a strong, if unintentional, bias which seriously affects their value. In France one of the earliest discussions was by M. Boudin,[2] who evidently obtained the Bemiss report (attributing it to Dr. O. W. Morris, who had quoted freely from Bemiss),[3] and enlarged greatly upon its fallacies. He also collected statistics of the deaf-mutes in Paris, and, by an amazing manipulation of figures, "demonstrated" that consanguinity of the parents was the cause of nearly one-third of the cases of congenital deafness. The savants of the Société d'Anthropologie took sides and the debate became very entertaining. Finally M. Dally came to the rescue, and published some very sane and logical articles which avoided both extremes, and first advanced

[1] See *Transactions of the American Medical Association*, 1858, pp. 321-425.

[2] "Du Croisement des familles," *Mem. de la Société d'Anthropologie*, vol. i, 1860-63, pp. 505-557.

[3] See Morris: "On Marriages of Consanguinity," in *Amer. Med. Times*, Mar. 23, 1861.

the theory that any ill effects of consanguineous marriage should be attributed to the intensification of inherited characteristics.[1]

In England similar discussions took place during the same period, complicated, however, by the presence of the patient and long-suffering "deceased wife's sister." The best of the English work has been the statistical study by George H. Darwin,[2] and the classic "Marriage of Near Kin" by Alfred H. Huth, a book of 475 pages, including a very complete bibliography to the date of the second edition, 1885. Although Mr. Huth's book is not free from error, and is encumbered with a large amount of worthless material, it is now after thirty-three years, by far the best treatment of the subject.

In Italy Dr. Montegazza,[3] in Spain Señor Pastor [4] and others, have made useful contributions. German writers have usually preferred more general subjects, but many of them have given much space to consanguineous marriage in sociological and biological works.

Since the appearance of the Bemiss report little has been published in this country which bears directly upon our subject. The most important American contribution, however, is to be found in the Special Report on the Blind and the Deaf, in the Twelfth Census of the United States, prepared by Dr. Alexander Graham Bell. Although American writers have had little part in the theoretical discussions, our

[1] See *Bulletins de la Société d'Anthropologie*, 1863, pp. 515-575; 1877, pp. 203-213.

[2] "Marriages of First Cousins in England and their Effects," *Journal Statistical Society*, 1875, pp. 153-184.

[3] *Studj Sui Matrimonj Consanguinei.* Quoted by Darwin, *op. cit.*, p. 178.

[4] "De los Matrimonios entre Parientes," *Memorias de la Real Academia de Ciencias Morales y Políticas*, vol. ii, pp. 369-400.

legislators have been active, so that the statutes of every state specify degrees of kinship within which marriage is prohibited. In at least sixteen states the prohibition is extended to include first cousins. In New Hampshire such marriages are void and the children are illegitimate. Other states in which first-cousin marriage is forbidden are Pennsylvania, Ohio, Indiana, Illinois, Michigan, Kansas, North Dakota, South Dakota, Wyoming, Nevada, Washington, Oregon, Missouri, Arkansas, and Louisiana. Since both Oklahoma and Indian Territory had similar laws, the present State of Oklahoma should probably be added to this list. In all of these states marriages within the prohibited degrees are incestuous or void or both, except in Ohio, where no express declaration is made in the statute. In Ohio, Indiana, Nevada and Washington the law is made to read: "and not nearer of kin than *second cousins*," therefore including "1½ cousins" within the prohibited degrees. In many states the marriage of step relatives is forbidden, as also marriage with a mother-in-law or father-in-law. Of the territories, Arizona, Alaska, and Porto Rico forbid the marriage of first cousins, but in Porto Rico the court may waive the impediment.

These laws probably have some effect in reducing the number of consanguineous marriages in these states, but the sentiment back of the law is more responsible for the decrease in the number of such unions than the law itself. For in the nature of things enforcement would be very difficult, and apparently little real effort is made in that direction. In Ohio, and probably elsewhere, the question as to consanguinity is not directly put to the applicants for a marriage license. The applicants are required to answer the

[1] Howard, *History of Matrimonial Institutions*, vol. ii, pp. 397, 433, 473.

usual questions in regard to age, parentage, residence, etc., and are then required to swear that their previous statements have been correct and that neither of them is "epileptic, imbecile or insane," that they are "not nearer of kin than second cousins, and not at the time under the influence of any intoxicating liquor or narcotic drug." Undoubtedly violations of the consanguinity clause are very frequent, and it is likewise easily evaded by going to another state where the laws are more liberal. One effect of the law is to provide a painless method of severing the marriage bond. A correspondent, who is a District Court Judge in Kansas, in reporting a case of first cousin marriage, adds that he "divorced them on the ground of consanguinity."

In the absence of direct investigation by the Census Bureau, or other public records of consanguineous marriages, perhaps the most promising field for research is in the genealogical records of American families. Several thousand volumes of such material have been published within the last half-century, and a large number of these are very carefully and scientifically prepared. The material gathered from such sources is very accurate in regard to the number of births, youthful deathrate etc., but mental or physical defects are rarely mentioned. The greatest objection to the utilization of this material, however, is the amount of labor necessary in order to glean the desired facts from the mass of irrelevant data. For example, in order to find one case of first cousin marriage it is necessary on an average, to examine the records of nearly two hundred other marriages.

The collection of data from personal sources is likewise open to grave objections. Not only is the informant likely to be biassed, but the cases which he will remember will be those in which something unusual has occurred. Herein lay the fallacy in the conclusions of Dr. Bemiss. I have

endeavored to overcome this bias by restricting my requests for information to genealogists and others who would more naturally appeal to records, but my efforts have been only partially successful.

The number of cases of consanguineous marriage, embracing all degrees of consanguinity, which I have collected from these two sources, genealogies and correspondence, is 723, a number too small in itself to establish any definite conclusions; but by using this material in connection with other related data, I trust I may be able to add something to the comparatively small amount of real knowledge which the world already possesses in regard to the marriage of kin.

In the course of my investigations I visited Smith's Island, in the Chesapeake Bay, about twelve miles across Tangier Sound, from Crisfield, Maryland, and nearly opposite the mouth of the Potomac. Here is a community of about seven hundred people, who are principally engaged in the sea-food industry. Their ancestors have lived on the island for many generations and there have been comparatively few accessions to the population from the mainland. As a natural consequence the population is largely a genetic aggregation. Consanguineous marriages have been very frequent, until now nearly all are more or less interrelated. Out of a hundred or more families of which I obtained some record, at least five marriages were between first cousins. All of these were fertile, and all the children were living and apparently healthy. Since over thirty per cent of the inhabitants bear one surname (Evans), and those bearing the first four surnames in point of frequency (Evans, Bradshaw, Marsh, and Tyler) comprise about fifty-nine per cent of the population, it will readily be seen that comparatively few absolutely non-related marriages take place. Yet in this community from September, 1904, to October, 1907, or during the residence there of the present physician, Dr.

P. H. Tawes, there have been 87 births and but 30 deaths, the latter from the usual causes. During this period there has not been a single case of idiocy, insanity, epilepsy, deaf-mutism or even of typhoid fever on the island.

The evidence gathered from various other isolated communities is very conflicting. Huth describes a great many of them which have existed for many generations without crosses without ill results. Other writers quote instances where whole communities have become degenerate. Until the antecedents of a community are known it is of course impossible to estimate the effect of consanguinity. The exceptionally high percentage of deaf-mutism on Martha's Vineyard may to some extent be due to a high percentage of consanguineous marriage, but that inbreeding is not the primary cause is revealed by the records showing that among the first settlers were two deaf-mutes, whose defect has been inherited from generation to generation for two hundred and fifty years.[1]

[1] See article in Cincinnati *Gazette*, Jan. 22, 1895.

CHAPTER II

Ratio of the Consanguineous to all Marriages

Towards determining the average frequency of occurrence of consanguineous marriages, or the proportion which such marriages bear to the whole number of marriages, little has as yet been done in this country. Professor Richmond Mayo-Smith estimated that marriages between near kin constituted less than one per cent of the total,[1] and Dr. Lee W. Dean estimates that in Iowa they comprise only about one half of one per cent.[2] But these estimates are little more than guesses, without any statistical basis.

In several European countries such marriages have been registered, though somewhat spasmodically and inaccurately. According to Mulhall [3] the ratio of the consanguineous among 10,000 marriages in the various countries is as follows:

TABLE I.

Country.	*Ratio.*	*Country.*	*Ratio.*
Prussia	67	Alsace	107
Italy	69	France	126
England	75	Jews	230

According to Uchermann the ratio is 690 or 6.9 per cent, including marriages between second cousins and nearer.[4] Dr. Feer says that 4 per cent of the marriages in Saxony

[1] *Statistics and Sociology*, p. 112.

[2] *Effect of Consanguinity upon the Organs of Special Sense*, p. 4.

[3] *Dictionary of Statistics*, p. 383.

[4] *Les Sourds-muets en Norvège.* Quoted by Feer, p. 9.

are consanguineous.[1] The ratio seems to be increasing in France but diminishing in Alsace and Italy, as indicated in Table II.[2]

TABLE II.

Country.	*Date.*	*Ratio.**	*Country.*	*Date.*	*Ratio.**
France	1853–60	97	France	1861–71	126
Alsace	1858–65	143	Alsace	1872–75	107
Italy	1868–71	84	Italy	1872–75	69

* Per 10,000.

In Italy the ratio varies greatly in different parts of the country. Mulhall gives the following figures for the years 1872-75:

TABLE III.

Province.	*Ratio.**	*Province.*	*Ratio.**
Venice	24	Sicily	117
Naples	30	Piedmont	131
Lombardy	100	Liguria	183

* Per 10,000.

It will be noted that the lowest ratios are in provinces where the urban population is comparatively large. Wherever statistics have been gathered it is the rule that the percentage of consanguineous marriage is greater in rural than in urban districts. Table IV, also from Mulhall, illustrates this point.

TABLE IV.

	Ratio per 10,000 Marriages.		
Country.	*Rural.*	*Urban.*	*General.*
England	79	71	75
France	130	115	126
Alsace	121	41	107
Norway* (Uchermann)	810	260	690

* Includes second cousins.

[1] *Der Einfluss der Blutsverwandschaft der Eltern auf die Kinder*, p. 9.

[2] Mulhall, *Dictionary of Statistics*, p. 383.

In regard to the degree of consanguinity, it seems very probable that in the French, German, Italian, and English statistics and estimates few if any marriages beyond the degree of first cousins are returned as consanguineous, so in order to compare the Norwegian figures with the others they should probably be reduced by one half. Out of 1549 consanguineous marriages contracted in Prussia in 1889, 1422 were between "cousins" (probably first), 110 between uncles and nieces, and 16 between nephews and aunts.[1] The ratio of such marriages to 10,000 in France during the fifteen years ending in 1875 was:[2]

TABLE V.

Degree.	*Urban.*	*Rural.*	*All France.*
Nephew and aunt	1.6	2.4	2.1
Uncle and niece	6.0	5.6	5.8
"Cousins"	96.0	119.0	113.1
Total	103.6	127.0	121.2

In Italy during seven years ending in 1874, of all consanguineous marriages 92 per cent were of cousins and 8 per cent were of uncle and niece or aunt and nephew.[3]

Dally[4] is very skeptical about the accuracy of the French figures, but says that in Paris the records are well kept. He found that in the years 1853-62 there were 10,765 marriages in the *8me arrondissement* of Paris, and of these he finds:

Marriages between cousins-german	141
Marriages between uncle and niece	8
Marriages between aunt and nephew	1
Total consanguineous	150

[1] Mulhall, *op. cit.*, p. 383.

[2] *Ibid.*, p. 384.

[3] *Ibid.*, p. 384.

[4] "Recherches sur les Mariages Consanguins et sur les Races Pures," in *Bulletins de la Société d'Anthropologie*, 1863, p. 527.

This is rather higher than the average for urban districts, according to official figures, but Dally seems to consider it as typical. He gives examples of the carelessness and incompetency of the rural record keepers, and insists that the percentage is really much higher than the official figures would indicate. He estimates the consanguineous marriages in France not including second cousins, at from four to five per cent.

A very ingenious method of determining the approximate number of first-cousin marriages was devised by Mr. George H. Darwin.[1] Noticing that in marriage announcements, some were between persons of the same surname, it occurred to him that there might be a constant ratio between same-name marriages and first cousin marriages. Some same-name marriages would of course be purely adventitious; so, to eliminate this element of chance, he obtained from the Registrar General's Report the frequency of occurrence of the various surnames in England. The fifty commonest names embraced 18 per cent of the population. One person in every 73 was a Smith, one in every 76 a Jones and so on. Then the probability of a Smith-Smith marriage due to mere chance would be $1/73^2$ and of a Jones-Jones morriage $1/76^2$. The sum of fifty such fractions he found to be .0009207 or .9207 per thousand. After the fiftieth name the fractions were so small as to have comparatively little effect upon the total. He therefore concluded that about one marriage in a thousand takes place, in which the parties have the same surname and have been uninfluenced by any relationship between them bringing them together.

The next step was to count the marriages announced in the "*Pall Mall Gazette*" for the years 1869-72 and a part

[1] "Marriages between First Cousins in England and their Effects," in *Journal of the Statistical Society*, June, 1875, pp. 154 *et seq.*

of 1873. Of the 18,528 marriages there found, 232 or 1.25 per cent were between persons of the same surname. Deducting the percentage of chance marriages at least 1.15 per cent were probably influenced directly or indirectly by consanguinity.

Mr. Darwin then proceeded by a purely genealogical method. He found that out of 9,549 marriages recorded in "Burke's *Landed Gentry*," 144 or 1.5 per cent were between persons of the same surname, and exactly half of these were first cousins. In the "*English and Irish Peerage*" out of 1,989 marriages, 18 or .91 per cent were same-name first cousin marriages. He then sent out about 800 circulars to members of the upper middle class, asking for records of first cousin marriage among the near relatives of the person addressed, and obtained the following result:

Same-name first cousin marriages	66
Different-name first cousin marriages	182
Same-name not first cousin marriages	29

These cases furnished by correspondents he calculated to be 3.41 per cent of all marriages in the families to which circulars were sent.

From the data collected from all these sources Mr. Darwin obtains the following proportion:

$$\frac{\text{Same-name first cousin marriages}}{\text{All same-name marriages}} = \frac{142}{249} = .57$$

He is inclined to think that the ratio should be lower and perhaps .50 instead of .57. By a similar line of reasoning he obtains this proportion:

$$\frac{\text{Same-name first cousin marriages}}{\text{Different-name first cousin marriages}} = \frac{1}{3}$$

Here too, he fears that the denominator is too small, for by theoretical calculation he obtains by one method the ratio

2/7, and by another $\frac{1}{1}$. He finally takes ¼ for this factor. To express the proportion in another form:

$$\frac{\text{Same-name first cousin marriages}}{\text{All first cousin marriages}} = \frac{1}{5}$$

The completed formula then becomes:

$$\frac{\text{All same-name marriages}}{\text{All first cousin marriages}} = \frac{100}{57} \times \frac{1}{5} = .35 \text{ (nearly)}.$$

Applying this formula to the English statistics, Mr. Darwin computes the percentages of first cousin marriages in England with the following results:

London	1.5
Other urban districts	2.
Rural districts	2.25
Middle class and Landed Gentry	3.5
Aristocracy	4.5

In order to apply this formula to the American population I counted the names in the New York Marriage License Record previous to 1784,[1] and found the number to be 20,396, representing 10,198 marriages. The fifty commonest names embraced nearly 15 per cent of the whole (1526), or three per cent less than the number found by Darwin.[2] Of these, one in every 53 was a Smith, one in 192 a Lawrence, and so on. The sum of the fraction $1/53^2$, $1/192$,[2] etc., I found to be .000757 or .757 per thousand, showing that the probability of a chance marriage between persons of the same name was even less than in England, where Mr. Darwin considered it almost a negligible quantity.

Of these 10,198 marriages, 211, or 2.07 per cent were between persons bearing the same surname. Applying Darwin's formula we would have 5.9 as the percentage of first

[1] *Names of Persons for whom Marriage Licenses were issued by the Secretary of the Province of New York.*

[2] *Cf. supra*, p. 21.

cousin marriages in colonial New York. This figure is evidently much too high, so in the hope of finding the fallacy, I worked out the formula entirely from American data. To avoid the personal equation which would tend to increase the number of same-name first cousin marriages at the expense of the same-name not first cousin marriages, I took only those marriages obtained from genealogies, which would be absolutely unbiassed in this respect. Out of 242 marriages between persons of the same name, 70 were between first cousins, giving the proportion:

$$\frac{\text{Same-name first cousin marriages}}{\text{All same-name marriages}} = \frac{70}{242} = .285$$

as compared with Darwin's .57. So that we may be fairly safe in assuming that not more than ⅓ of all same-name marriages are first cousin marriages. Taking data from the same sources and eliminating as far as possible those genealogies in which only the male line is traced, we have it:

$$\frac{\text{Same-name first cousin marriages}}{\text{Different-name first cousin marriages}} = \frac{24}{62} = \frac{1}{2\frac{7}{12}}$$

This is near the ratio which Darwin obtained from his data, and which he finally changed to ¼. I am inclined to think that his first ratio was nearer the truth, for since we have found that the coefficient of attraction between cousins would be so much greater than between non-relatives, why should we not assume that the attraction between cousins of the same surname should exceed that between cousins of different surnames? For among a large number of cousins a person is likely to be thrown into closer contact, and to feel better acquainted with those who bear the same surname with himself. But since the theoretical ratio would be about ¼ it would hardly be safe to put the probable ratio higher than ⅓, or in other words four first cousin mar-

riages to every same-name first cousin marriage. Our revised formula then is:

$$\frac{\text{All same-name marriages}}{\text{All first cousin marriages}} = \frac{3}{1} \times \frac{1}{4} = .75$$

Instead of Mr. Darwin's .35.

Taking then the 10,198 marriages, with their 2.07 per cent of same-name marriages, and dividing by .75 we have 2.76 per cent, or 281 first cousin marriages.

In order to arrive at approximately the percentage of first cousin marriages in a nineteenth-century American community I counted the marriage licenses in Ashtabula County, Ohio, for seventy-five years, (1811-1886). Out of 13,309 marriages, 112 or .84 per cent were between persons of the same surname. Applying the same formula as before, we find 1.12 per cent of first cousin marriages, or less than half the percentage found in eighteenth-century New York. This difference may easily be accounted for by the comparative newness of the Ohio community, in which few families would be interrelated, and also to that increasing ease of communication which enables the individual to have a wider circle of acquaintance from which to choose a spouse.

Adopting a more direct method of determining the frequency of cousin marriage, I estimated in each of sixteen genealogical works, the number of marriages recorded, and found the total to be 25,200. From these sixteen families I obtained 153 cases of first cousin marriage, or .6 per cent. Allowing for the possible cases of cousin marriage in which the relationship was not given, or which I may have overlooked, the true percentage is probably not far below the 1.12 per cent obtained by the other method.

The compiler of the, as yet, unpublished Loomis genealogy writes me that he has the records of 7500 marriages in that family, of which 57 or .8 per cent are same-name mar-

riages. This would indicate that 1.07 per cent were between first cousins.

In isolated communities, on islands, among the mountains, families still remain in the same locality for generations, and people are born, marry and die with the same environment. Their circle of acquaintance is very limited, and cousin marriage is therefore more frequent. If we exclude such places, and consider only the more progressive American communities, it is entirely possible that the proportion of first cousin marriages would fall almost if not quite to .5 per cent. So that the estimate of Dr. Dean for Iowa may not be far out of the way.

Even for England Mr. Darwin's figures are probably much too large. Applying the corrected formula his table becomes:

TABLE VI.

1872.	*Number marriages registered.*	*Per cent of same-name marriages.*	*Per cent of first cousin marriages.*
London, Metropolitan Districts	33,155	.55	.73
Urban Districts	22,346	.71	.95
Rural Districts	13,391	.79	1.05
Total	68,892	.64	.85*

* *Cf.* Mulhall, .75 per cent, *supra*, p. 18.

In regard to the frequency of marriage between kin more distant than first cousins figures are still more difficult to obtain. The distribution of 514 cases of consanguineous marriage from genealogies was as follows:

TABLE VII.

	First cousins.	1½ cousins.	Second cousins.	2½ cousins.	Third cousins.	Distant cousins.	Total.
Same-name	70	24	49	19	20	26	208
Different-name	96	30	58	22	37	62	305
Total	166	54	107	41	57	88	513

Obviously this cannot be taken as typical of the actual distribution of consanguineous marriages, since the more distant the degree, the more difficult it is to determine the relationship. However it is very evident that the coefficient of attraction is at its maximum between first cousins, and probably there are actually more marriages between first cousins than between those of any other recognized degree of consanguinity. But the two degrees of 1½ cousins and second cousins taken together probably number more intermarriages than first cousins alone. Allowing four children to a family, three of whom marry and have families, the actual number of cousins a person would have on each degree would be: First, 16; 1½, 80; Second, 96; 2½, 480; Third, 576; Fourth, 3,456. The matter is usually complicated by double relationships, but it will readily be seen that the consanguineal attraction would hardly be perceptible beyond the degree of third cousins.[1]

Omitting, as in the discussion on page 24, those genealogies in which only the male line is given we have the following table:

TABLE VIII.

	First cousins.	1½ cousins.	Second cousins.	2½ cousins.	Third cousins.	Distant cousins.	Total
Same-name	24	5	10	4	2	5	50
Different-name.	62	15	33	12	23	26	171
Total	86	20	43	16	25	31	221

It would naturally be supposed that with each succeeding degree of relationship the ratio of same-name to different-name cousin marriages would increase in geometrical proportion, viz. first cousins, 1 : 3; second cousins, 1 : 9; third cousins, 1 : 27, etc., but on the other hand there is the tendency for families of the same name to hold together even

[1] See note, *infra*, p. 29.

in migration as may be proved by the strong predominance of certain surnames in nearly every community. So that the ratio or same-name to different-name second cousin marriages may not greatly exceed 1 : 4. Beyond this degree any estimate would be pure guesswork. However the coefficient of attraction between persons of the same surname would undoubtedly be well marked in every degree of kinship, and conversely there are few same-name marriages in which some kinship, however remote, does not exist.

The proportion of mixed generation cousin marriages (1½ cousins, 2½ cousins, etc.) is always smaller than the even generation marriages of either the next nearer or more remote degrees. For example, a man is more likely to marry his first or his second cousin than either the daughter of his first cousin, or the first cousin of one of his parents, although such mixed generation marriages often take place.

The conclusions, then, in regard to the frequency of consanguineous marriage in the United States may be summarized as follows:

1. The frequency varies greatly in different communities, from perhaps .5 per cent of first cousin marriages in the northern and western states to 5. per cent, and probably higher, in isolated mountain or island communities. The average of first cousin marriage in the United States is probably not greater than one per cent.

2. The percentage of consanguineous marriages is decreasing with the increasing ease of communication and is probably less than half as great now as in the days of the stage coach.

3. Although the number of marriageable second cousins is usually several times as great as that of first cousins, the number of marriages between second cousins is probably somewhat less than the number of marriages between first cousins, but the number of second cousin marriages com-

bined with the number of 1½ cousin marriages probably exceeds the number of first cousin marriages alone. So that the percentage of marriages ordinarily considered consanguineous is probably between two, and two and a half.

NOTE.—In an article entitled "Sur le nombre des consanguins dans un groupe de population," in *Archives italiennes de biologie* (vol. xxxiii, 1900, pp. 230-241), Dr. E. Raseri shows that from one point of view the actual number of consanguineous marriages is little, if any, greater than the probable number. The average number of children to a marriage he finds to be 5, the average age of the parents 33 and the average age at marriage 25. The Italian mortality statistics show that 54 per cent of the population lives to the age of 25, of which 15 per cent does not marry, leaving an average of 2.3 children in every family who marry. On this basis a person would have at birth 4,357 relatives within the degree of fourth cousins; at the age of 33 he would have 4,547; and at 66, 5,002. In 1897 out of 229,041 marriages in Italy, 1,046 were between first cousins, giving an average of one in 219. In 1881 the number of men between 18 and 50 and of women between 15 and 45 was 5,941, 495 in 8,259 communes with an average population of 3,500. In each commune there must be 360 marriageable persons of each sex, but to marry within his class a man would only have the choice of 180 women and *vice versa*. Adding the probable number who would marry outside the commune, the choice lies within 216 of the opposite sex. Of these 25 would be cousins within the tenth degree (fourth cousins) making the probability of a consanguineous marriage .11, reduced by a probable error in excess to .10. The probability of a first cousin marriage would be $\frac{8}{216}$ or .0038, whereas the actual ratio is $\frac{1}{219}$ or .0045.

CHAPTER III

Masculinity

The predominance of male over female births is almost universal, although varying greatly in different countries and under different conditions. This fact has given rise to the term Masculinity, which conveniently expresses the proportion of the sexes at birth. The degree of masculinity is usually indicated by the average number of male births to every 100 female births. The cause of this preponderance of males is still a mystery, and will definitely be known only when the causes of the determination of sex are known. Since, however, it is well known that infant mortality is greater among males than among females, positive masculinity is necessary to keep up the balance of the sexes, and therefore seems to be an essential characteristic of a vigorous and progressive race.

Within recent years the theory has prevailed among certain sociologists that positive masculinity is stronger in the offspring of consanguineous marriages than in the offspring of unrelated parents. Professor William I. Thomas in his writings and lectures asserts this as highly probable.[1] Westermarck,[2] to whom Professor Thomas refers, quotes authorities to show that certain self-fertilized plants tend to produce male flowers, and that the mating of horses of the same coat color tends to produce an excess of males.[3]

[1] *Sex and Society*, p. 12. [2] *History of Human Marriage*, p. 476.

[3] *Goehlert, Ueber die Vererbung der Haarfarben bei den Pferden.* Quoted by Westermarck, p. 476.

Westermarck continues, quoting from Düsing:[1] "Among the Jews, many of whom marry cousins, there is a remarkable excess of male births. In country districts, where, as we have seen, comparatively more boys are born than in towns, marriage more frequently takes place between kinsfolk. It is for a similar reason that illegitimate unions show a tendency to produce female births."

Westermarck comments: "The evidence for the correctness of his deduction is, then, exceedingly scanty—if, indeed it can be called evidence. Nevertheless, I think his main conclusion holds good. Independently of his reasoning I had come to exactly the same result in a purely inductive way." He then quotes a number of travelers to the effect that marriage between members of different races produce a phenomenal excess of female births. When we consider the extraordinary proficiency in fiction attained by many travelers in strange lands, we are forced to the belief that Westermarck based his own conclusion on still more scanty evidence.

The statistics given by Dr. Düsing for Prussia[2] are as follows:

TABLE IX.

	Evangelical.	*Catholic.*	*Other Christians.*	*Jews.*
Male births....	4,015,634	2,273,708	12,283	69,901
Female births..	3,775,010	2,136,295	11,548	64,939
Masculinity....	106.374	106.435	106.36	107.64

and for mixed marriages:

TABLE X.

	Evangelical and Catholic.	*Catholic and Evangelical.*	*Other mixed.*	*Jews and Christians.*
Male births....	157,755	189,733	4,464	2,958
Female births..	149,205	179,505	4,254	2,850
Masculinity....	105.73	105.70	104.9	103.8

[1] *Die Regulierung des Geschlechtsverhaeltnisses*, pp. 243-244.

[2] *Das Geschlechtsverhaeltnis der Geburten in Preussen*, pp. 24-25; in *Staatswissenschaftliche Studien*, vol. iii.

In the face of these statistics it is impossible to deny that endogamy within a great social class or an ethnic race may have some tendency to produce an excess of male births, while exogamy in this broad sense may diminish the masculinity. But the perpetuation of a comparatively pure race by marriage within that race, and consanguineous marriage in the narrower sense are different propositions. It may easily be that the marriage of individuals of a similar type regardless of consanguinity produces a greater excess of male offspring. According to the percentage of first cousin marriages among the Jews as given by Mulhall,[1] and allowing the average number of children to a marriage, there would be only 3100 children of such marriages among the Jewish births in Prussia, and in order that these might raise the masculinity of Jewish births even from 106 to 107 the 3100 births would have to have a masculinity of 200. Among Protestants, or especially among Catholics where the percentage of cousin marriage is much smaller, it seems hardly reasonable that the general masculinity would be appreciably affected. A much better case can be made for similarity or difference of race as the cause of the variation. The difference between Catholic and Protestant is, roughly speaking, the difference between the brachycephalic brunette Alpine race and the dolichocephalic blonde Baltic race. So that a mixed marriage in Germany would almost always mean the crossing of two distinct types.

The investigations of M. Gache in Buenos Ayres covering the period from 1884 to 1894 inclusive, show that cross breeding has had the effect of *raising* the masculinity. The births resulting from unions of Italian, Spanish and French male immigrants with native-born Argentine females, show a higher masculinity than the births produced either by pure

[1] *Dictionary of Statistics, op. cit.*, p. 383.

Argentine alliances or by pure alliances of any of these nationalities of Buenos Ayres. Further, the unions of Argentine males with females of foreign nationality provide a higher masculinity than is common among Argentines themselves.[1] These facts do not necessarily contradict the theory that any crossing of great racial groups diminishes masculinity, for all of the nationalities involved in this study are predominantly Mediterranean in blood. The theory is borne out by the statistics of the negroes in the United States, a large proportion of whom are of mixed blood. For taking as a basis the number of children of negro descent born during the year ending June 1, 1900 reported by the Twelfth Census, the females predominated, giving a negative masculinity of 99.8. Furthermore, the percentage of consanguineous marriage is probably high in the colored population.

The following table compiled from Mulhall[2] and other sources fails to show any correspondence between the percentage of first cousin marriage and the masculinity:

TABLE XI.

Country.	*Masculinity.*	*Per cent 1st cousin marriage.*	*Country.*	*Masculinity.*	*Per cent 1st cousin marriage.*
England	104.5	.75	Prussia.....	105.8	.67
France	105.3	1.26	U. S.[3].....	104.9	1.00
Italy	107.0	.69	Jews[4].....	107.6	2.30

It is impossible to obtain the actual masculinity ratio for the United States, for the Census gives the statistics for only

[1] C. J. & J. N. Lewis, *Natality and Fecundity*, pp. 114-116.

[2] *Op. cit.*, p. 92.

[3] Masculinity, *Twelfth Census, Vital Statistics*, Pt. 1. Per cent of cousin marriage, estimated.

[4] Duesing, *op. cit.*, p. 24.

one year in ten and even then is untrustworthy on this point. In a few states birth registration is attempted but the figures thus obtained do not harmonize with the Census and the situation is not greatly improved.[1] The masculinity varies considerably in different parts of the country, and is generally higher in states where the rural population predominates. This fact agrees with European statistics which almost universally show a high masculinity in rural districts. Table XII, illustrates this point:

TABLE XII.

Masculinity in Scotland.[2]

Period.	*Principal towns.*	*Large towns.*	*Small towns.*	*Mainland rural districts.*	*Insular rural districts.*
1855–1861.....	——	——	——	105.6	106.6
1862–1871.....	——	——	——	105.9	105.6
1872–1881.....	105.0	105.6	106.1	105.3	108.0
1882–1891.....	105.1	105.6	105.5	105.5	108.7
1892–1901.....	104.7	104.6	104.9	105.2	107.1
Average....	104.9	105.3	105.5	105.5	107.2

This would seem to bear out the theory that masculinity is affected by consanguineous marriage, for consanguineous marriage is more frequent in rural districts, and especially in insular rural districts. But unless consanguineous marriages can directly be shown to produce an excess of male births greater than the normal, such indirect evidence is valueless.

In the genealogical material previously considered, we have a sampling of the American population throughout its whole history, but the data so far collected are insufficient

[1] Massachusetts *Census*, 103.1; Reg. 1891-1900, 105.6. Vermont *Census*, 108.1; Reg. 1890-1896, 105.9. Connecticut *Census*, 103.9; Reg. 1887-1891, 107.2. Rhode Island *Census*, 103.8; Reg. 1854-1901, 104.9.

[2] Lewis and Lewis, *op. cit.*, p. 128.

for more than an indication of what might be expected in further research along the same line. In the following table as before, the figures compiled from printed genealogies are separated from those obtained through correspondence and from miscellaneous sources. The "unrelated" marriages from genealogies, are marriages of brothers and sisters of the persons who have married first cousins, and their records were obtained from the same sources as those in the next previous category. The "children of first cousins" are the offspring of the first cousin marriages who married persons not related to themselves by blood. The last category includes distantly related marriages from correspondence and other sources and marriages between persons of the same surname whose relationship could not be traced.

TABLE XIII.

Marriages.	*Number fertile.*	*Sex of Children.* *Male.*	*Female.*	*Unknown.*	*Masculinity.*
1st cousin. Gene.	125	318	314	40	101
Unrelated. Gene.	629	1561	1559	64	100
Ch. of 1st cousins. Gene.	170	402	375	48	107
Other cousin. Gene.	301	736	666	15	111
1st cousin. Cor.	150	316	295	148	107
Ch. of 1st cousins. Cor.	124	192	164	214	111
Miscellaneous	88	210	205	50	102
Total	1587	3735	3578	578	104.4

It is of course impossible to explain all the ratios in this table. Much variation is here due to chance, and a few additional cases might appreciably change any of the ratios. It will be noticed, however, that the two categories whose masculinity is most similar (100 and 101), are derived from cases taken from the same families and from the same environment, and differing only in that the first is closely consanguineous while the second is not. The third and fourth

groups, separated from the first two by at least a generation, and probably living in a different environment, differ greatly in masculinity from them. In the fourth group are included 1½, second, third, and a few even more distant cousins, all more distantly related than first cousins and taken from the same genealogies as these; yet the masculinity is much greater.

An analysis of the cases collected fifty years ago by Dr. Bemiss, of course without thought of masculinity, gives the following result:[1]

TABLE XIV.

		Sex of Children.		
Marriage.	*Number.*	*Male.*	*Female.*	*Masculinity.*
1st cousins and nearer	709	1245	1171	106.3
2d and 3rd cousins	124	264	240	110.0
All consanguineous	833	1509	1411	106.9
Unrelated	125	444	380	116.9

In the "Marriage of Near Kin," Mr. Huth gives a list of cases of consanguineous marriage collected by various persons from all over Europe.[2] He is free to say that they are worse than useless for the purpose for which they were collected, that of determining whether or not such marriages produce degeneracy, but in so far as the sex of the children is concerned they would not be biassed.

TABLE XV.

	Sex of Children.		
Marriage.	*Male.*	*Female.*	*Masculinity.*
1st cousins and nearer	165	164	100.
More distant cousins	95	73	131.

The unusual ratios are of course due principally to a "run of luck," and this table only shows that if consanguinity is

[1] Bemiss, *Report on Influence of Marriages of Consanguinity*, pp. 420-423.

[2] Huth, *Marriage of Near Kin. Appendix.*

a determining factor in sex, its influence is negligible when a small number of cases is considered. It is interesting accordingly to note that of 100 children of incestuous unions and from uncle-niece and aunt-nephew marriages from Bemiss, Huth and other sources, the sex distribution was 48 males and 52 females, giving a negative masculinity of 92.

While in general the evidence presented in this chapter is somewhat conflicting, that which bears most directly upon the problem does not substantiate the hypothesis of Westermarck. The evidence in favor of the theory is all indirect and is open to other interpretations. It is hardly safe to go to the other extreme and to assert that consanguinity diminishes masculinity. The safest, and withal the most reasonable conclusion is that consanguinity in the parents has no appreciable effect upon the sex of the child.

CHAPTER IV

Consanguinity and Reproduction

The principal object of nearly every previous discussion of the intermarriage of kindred, has been either to prove or to disprove some alleged injurious effect upon the offspring. The writers who have treated the subject may be divided into three groups. First, those who have maintained in accordance with popular opinion that consanguinity *per se* is a cause of degeneracy or that in some mysterious way kinship of the parents produces certain diseases in the children. In this group Boudin in France and Bemiss in America are typical. Second, those who have flatly contradicted this position and have asserted that on the whole such marriages are beneficial, and that crossing is in itself injurious to the race. Huth is the chief exponent of this theory, although he admits that where degenerate conditions exist in the parents consanguinity in marriage may not be beneficial. The third group holds that cousin marriages in themselves, especially if not carried through too many generations, are not harmful, but that if any hereditary tendency to malformation or disease exists in the family of the parents, this tendency, inherited through both parents is strongly intensified in the offspring, and that consequently an increased percentage of the offspring of cousin marriage may be afflicted with hereditary diseases. This group includes a number of the later writers such as Feer and Mayet. Among the earlier discussions, those of Dally in France and

George H. Darwin in England take substantially this position. On the whole this theory seems to be the most reasonable one and with a few modifications it will be seen to account for all the facts herein presented.

It is undeniable that degeneracy does in some cases follow from the marriage of near kin, and probably with greater frequency than from non-related marriages. But it is likewise true that many of the world's greatest men have been the products of close inbreeding, sometimes continued through several generations. Frederick the Great of Prussia was the product of three successive cousin marriages between descendants of William the Silent,[1] and among his seven brothers and sisters at least three others ranked among the ablest men and women of the generation. Cousin marriage has always been frequent in the "first families of Virginia" which have produced a phenomenal percentage of able men. In fact, few persons who have traced their pedigrees back through a number of generations, do not find some names duplicated, as a result of cousin marriage.

The ills which have at one time or another been attributed to consanguineous marriage include nearly all those which cannot otherwise be satisfactorily accounted for. But with the progress of pathology the list has greatly been reduced: for instance, crétinism is now known to be a product

[1] Woods, *Heredity in Royalty*, pp. 74-75. The Great Elector, a great-grandson of William the Silent, married his 1½ cousin, a granddaughter of William and also a great-granddaughter of Admiral Coligny. Frederick I married his second cousin, daughter of the Duchess Sophia of Brunswick, and a descendant of William. Frederick William I married his first cousin, Dorothea, granddaughter of Sophia, and also a descendant of William the Silent. Unfortunately the Hohenzollern line was continued by a mediocre brother of Frederick II, but through his sister, Queen Ulrica, the line of genius lasted still another generation to Gustavus III of Sweden.

of local conditions. The remaining counts in the indictment against consanguineous marriage may roughly be classified as: 1. The production of infertility, some forms of physical degeneracy, and deformity. 2. The production or aggravation of mental and nervous disorders. 3. The production of certain defects in the organs of special sense. These three divisions will be discussed separately.

1. INFERTILITY AND DEGENERACY

Although there has never been any considerable evidence for the first of these charges, it has frequently been repeated. Professor Montegazza of the University of Pavia collected data in regard to 512 cases of consanguineous marriage of which between 8 and 9 per cent were sterile, and with this basis he asserts that sterility is the only fact which can safely be deduced from his cases, since it cannot be hereditary.[1] But if in the nature of things absolute sterility is not inheritable, comparative infertility may be. And even then 8 or 9 per cent does not seem to be an excessively high proportion of sterility, especially if late marriages be counted. Boudin bases his assertion on this point on even less tenable grounds.[2] On the other hand some writers assure us that cousin marriages are even more prolific and less liable to sterility than the average.

The most important statistical investigation was made by G. H. Darwin.[3] From his genealogical data he compiled the following table:

[1] See Darwin, "Marriages between First Cousins in England and Their Effects," *Journal of Statistical Society*, June, 1875, p. 178.

[2] Boudin, "Croisement des familles, de races et des espèces." In *Memoires de la Société d' Anthropologie*, vol. i, p. 518.

[3] *Op. cit.*, p. 181.

TABLE XVI.

Parentage.	Number of marriages.	Average number sons to marriage.	Per cent sterile marriages.	Ave. no. sons to fertile marriage.
Not consanguineous ..	217	1.91	15.9	2.26
Parents 1st cousins*..	97 to 105	2.07 to 1.92	14.7 to 20.9	2.43
One parent offspring of 1st cousin marriages.	93	1.93	17.2	2.34

* Eight cases of doubtful fertility.

It will readily be seen that the conclusion is negative, since the variation is slight, but the higher fertility of the cousin marriages is interesting.

On the other hand de Lapouge quotes a case of a community founded two centuries ago by four families and populated almost entirely by their descendants, in which from 1862 to 1886 there were 273 marriages of which 63 were consanguineous and 26 were between first cousins. Among the non-consanguineous 3 per cent were uniparous, as against 7.95 per cent among the consanguineous. 7.5 per cent of the non-consanguineous were sterile as against 16 per cent of the consanguineous.[1] The importance of these percentages is impaired by the fact that they involve only five uniparous families and ten sterile ones, and that of these latter only five were sprung from first cousins.

It is almost impossible to get any accurate statistics of sterility from genealogies, for when no children are given in the record, there is always a strong possibility that there were children of whom the genealogist has no record. However, of 16 first-cousin marriages of which the record expressly stated "no issue," or where it was practically certain that no issue was possible, the average age of the brides was 34.3 years and that of the grooms was 39 years,

[1] De Lapouge, *Les Selections Sociales*, p. 196.

showing that consanguinity could not have been the only cause of their sterility.

In regard to relative fertility the figures are reliable, but they fail to indicate any effect of consanguinity upon fertility, as will be noted in Table XVII.

TABLE XVII.

Parentage.	*No. of fertile marriages.*	*No. of children.*	*Ave. to fertile marriage.*
First cousin. Gene.	125	672	5.4
First cousin. Cor.	150	759	5.1
Double cousins and uncle-niece	9	39	4.3
Other consanguineous	333	1605	4.8
Non-related	676	3417	5.1
Ch. of 1st cousins	294	1395	4.7
All consanguineous	617	3075	5.0
All non-related	970	4812	5.0

The report of Dr. Bemiss, and the report of the Ohio commission [1] which he quotes, give the following figures: [2]

TABLE XVIII.

Parentage.	*No. of fertile marriages.*	*No. of children.*	*Ave. to fertile marriages.*
1st cousins or nearer*	660	3363	5.0
More distantly related	119	572	4.8
Non-consanguineous	125	837	6.7
Ohio consanguineous	155	1021	6.6
Ohio non-consanguineous	200	1375	6.9

*Includes double-cousins and uncle-niece marriages.

The comparatively low averages of the consanguineous marriages from Bemiss may easily be accounted for by the fact that the cases were highly selected so that nearly one-third of the children were in some way defective, and the

[1] Appointed to ascertain the number of the deaf and dumb, blind, idiotic and insane within the State.

[2] See Bemiss, in *Trans. of Am. Med. Asso.*, vol. xi, 1858, pp. 420-425.

parents in many cases were far below the average in vitality. The " more distantly related " are in a still lesser degree representative of the class, since out of a greater possibility of choice a smaller number were chosen. The " non-consanguineous " were supposed to be near the average in vitality and fertility.

In Norway, according to Uchermann, the consanguineous and the non-consanguineous marriages are equally fertile, averaging 6.1 children per marriage;[1] and in a Black Forest village Tenckhoff found an average of 4.6 children to each consanguineous marriage as against 3.5 to each non-consanguineous marriage.[2]

In regard to the youthful death-rate among the offspring of consanguineous marriages, comparison with non-related marriages is more feasible. I have counted in each case all those children who are known to have died under the age of twenty. This age was taken for the sake of convenience, and to include all children indefinitely specified as having " died young." The results are given in Table XIX:

TABLE XIX.

Parentage.	*No. of Children.*	*No. dying under 20.*	*Per cent.*
(*Genealogies.*)			
First cousins	672	113	16.7
Other cousins	1417	211	14.9
Ch. of 1st cousins	825	103	12.5
Non-consanguineous	3184	370	11.6
(*Correspondence.*)			
First cousins	759	88	11.6
Other marriages	829	71	8.6

If the figures in Table XIX are to be accepted at their

[1] Feer, *Der Einfluss der Blutsverwandschaft der Eltern auf die Kinder*, p. 12, *note*.

[2] *Ibid.*

face value, and there seems to be no good reason for not doing so in the genealogical cases at least, the youthful death-rate among the offspring of consanguineous marriages far exceeds the average. The average in the correspondence cases is undoubtedly too low, as many correspondents failed to report the deaths. From the fact that a comparatively large percentage of these were reported as defective, we should expect a higher death-rate than among the unbiased genealogical cases.

Dr. Bemiss found a very high death-rate among the children of consanguineous marriage, due partly to the fact that his cases were reported by physicians. He reports that of the offspring of marriages between first cousins and nearer relatives, 23 per cent "died young;" of the offspring of more remote consanguineous marriages, 16 per cent; and of non-related marriages 16 per cent. There is, therefore, a strong indication of lowered vitality as a result of consanguineous marriage.

A determination of even the approximate percentage of degenerate offspring resulting from marriages of consanguinity by direct inquiry is exceedingly difficult. The average human mind is so constituted as to exaggerate unconsciously the unusual in its experience. Herein lies the fallacy in the work of Dr. Bemiss. His material was "furnished exclusively by reputable *physicians* in various states," and of the 3942 children of consanguineous marriages in the cases thus furnished him, 1134 or 28.8 per cent were in some way "defective." Of these, 145 were deaf and dumb, 85 blind, 308 idiotic, 38 insane, 60 epileptic, 300 scrofulous and 98 deformed. It is evident that a physician in reporting such data to a physician would naturally give cases in which something pathological existed. Even if there were no conscious bias, such cases would be the ones with which a physician would be most likely to come in contact. Dr.

Bemiss himself recognized the possibility of this bias. To quote him:

> It is natural for contributors to overlook many of the more fortunate results of family intermarriage, and furnish those followed by defective offspring and sterility. The mere existence of either of these conditions would prompt inquiry, while the favorable cases might pass unnoticed. Contributors have been particularly requested to furnish without prejudice or selection all instances of the marriage of consanguinity within their various circles of observation, whatever their results.[1]

Yet he does not seem to believe that this bias seriously affects his conclusions.

In order as far as possible to avoid this bias, I sent my own circulars to genealogists and others who would naturally be more interested in the relationships than in pathological conditions. I asked, however, that all such results be noted. Among 722 children of first cousins I found 95 or 13 per cent who were defective in the sense in which Bemiss used the term. This is much nearer the actual percentage, but I have reason to believe, as will be seen hereafter, that even this percentage is far too high. A good illustration of the unconscious bias, which I tried to avoid is afforded by the reports on the cause of death among children of first cousins. Only 58 replies were given to this question, and of the 58 deaths 14 or one-fourth were either accidental or otherwise violent, while only one person was reported to have succumbed to pneumonia.

Many efforts have been made to investigate the occurrence of degeneracy in the offspring of consanguineous marriages, by studying communities in which such unions have

[1] Bemiss, see *Trans. of Am. Med. Asso.*, vol. xi, 1858, p. 323.

been frequent, but the results are untrustworthy. Huth [1] quotes a number of instances where communities have lived for generations without crosses and with no apparent degeneracy, while other writers tell of high percentages of degeneracy. Smith's Island, Maryland, as has been said, seems absolutely free from serious congenital abnormalities, in spite of the great frequency of consanguineous marriages.

The causes of degeneracy are so varied, complicated, and obscure that even if consanguinity is a cause, there can be but few cases in which it is not complicated by other factors. But for the same reason that it is so difficult to prove any connection between consanguinity and degeneracy, it is equally difficult to disprove such a connection. It is very probable that from the mere operation of the law of heredity, there must be a comparatively large percentage of degenerates among the offspring of related parents, for defects which tend to be bred out by crossing are accentuated by inbreeding. This may be the reason for the disagreement among investigators of isolated communities. If an island, for instance, were settled by a small group of families in even one of which some hereditary defect was common, in the course of a few generations that defect would be found in a relatively large part of the population. While if the same island were settled by perfectly sound families, there would only be a remote chance of any particular defect appearing. Thus both classes of investigators may be perfectly conscientious, and yet arrive at diametrically opposite results. This theory is at least not to be contradicted by any facts which have come to light in the present investigation.

Some interesting points are brought up in Dugdale's well-

[1] *Marriage of Near Kin*, chap. iv.

known study of the "Jukes."[1] This family, of about 540 persons living in northern New York, is descended from five sisters of unknown parentage, who were born between 1740 and 1770. The name "Juke" is fictitious, and is applied to all descendants of these five women, little attempt being made to trace the male lines on account of the excessive prevalence of illegitimacy.

In this family consanguineous marriages have been very frequent, perhaps partly because the Jukes came to be looked upon as pariahs and could not associate on equal terms with other members of the community. These marriages seem to have been fully as productive as the average of the family, and the offspring of as high a grade of intelligence. However, some individual cases are worthy of special mention as illustrative of intensification of hereditary tendencies.

(1) An illegitimate son of Ada Juke married a daughter of Bell Juke. He was a laborer, honest and industrious. She was reputable and healthy, and her father had a good reputation, but her mother had given birth to four illegitimate children before marriage, three of whom were mulattoes. Thus in this marriage of first cousins, three out of the four parents were of a low moral grade. As a result of this marriage three sons and three daughters were born. Two sons were licentious, intemperate and dishonest, two daughters were prostitutes, and the third became such after her husband was sent to prison. Only one son turned out fairly well. This son married a second cousin, a granddaughter of Delia Juke, and four out of his seven children were above the average of the family. His two elder brothers, however, married prostitutes, and became ancestors of criminals, prostitutes and syphilitics.[2]

[1] R. L. Dugdale, *The Jukes*.

[2] *Ibid.*, Chart I

(2) A legitimate son of Ada Juke, whose father was a thief and a pauper, married a daughter of Clara Juke, whose antecedents were fairly good. The husband had contracted syphilis before marriage and entailed it upon every one of his eight children. Five daughters became prostitutes and one was idiotic. The only daughter who bore a good reputation married a grandson of both Clara and Bell Juke. This was a remarkable case of selection. Both husband and wife were grandchildren of Clara, and so first cousins, and both were the offspring of first cousins, all within the Juke blood. But, on the other hand, both were the descendants of Clara, the best of the Juke sisters, and both were the best of the progeny of their respective parents. The only serious taint was the secondary syphilis which the wife had inherited from her father. Six children were born, two males and four females. The eldest son was at 31 "laborer, industrious, temperate;" the eldest daughter "good repute, temperate, read and write;" second daughter, "harlot;" third daughter "good repute, temperate;" and the two youngest are given simply as "unmarried." This family seems to have had as high an average mentally and morally as any family in the whole tribe, only one in six being distinctly immoral. In the next generation, the eldest son had two children, the eldest daughter four, and the third daughter, who married a first cousin, had one child. It would be of great interest to know more of this last marriage, the third generation of consanguinity in marriage, and the fourth first-cousin marriage in three generations, but at the time the book was written the parties were still in their early twenties.[1]

Mr. Dugdale makes the following "tentative inductions." 1. Boys preponderate in the illegitimate lines. 2. Girls

[1] Dugdale, *op. cit.*, Chart II.

preponderate in the intermarried branches. 3. Lines of intermarriage between Jukes show a minimum of crime. 4. Pauperism preponderates in the consanguineous lines. 5. In the main, crime begins in progeny where Juke blood crosses X blood. (Anyone not descended from a Juke, is of "X blood"). 6. The illegitimate lines have chiefly married into X.[1] The third and fourth inductions might indicate that a lowered vitality of the consanguineous lines changed a tendency toward crime into the less strenuous channel of pauperism, but I cannot find in Mr. Dugdale's charts any sufficient basis for the induction. It is true that the most distinctively pauper line is consanguineous, but it is less closely inbred than the "semi-successful" branch. As to the fifth induction, a close examination of the data shows clearly that in nearly every case where an X marriage occurred, it was with a person of a distinctly immoral or criminal type. Cousin marriage has also been frequent in the middle western counterpart of the Jukes, the "Tribe of Ishmael."[2]

A more recent study of hereditary degeneracy is that of the "Zero Family" in Switzerland.[3] Here the first degenerate was the product of two successive consanguineous marriages, both with a branch tainted *with insanity*. In spite of his bad ancestry he lived to the age of 106 years. He married an Italian woman of questionable antecedents, and was the father of a large family. Three hundred and ten of his descendants are mentioned, of whom many are still young. Of these 310, 74 died in early childhood, 55 are or were vagabonds, 58 were weak-minded or idiotic and 23

[1] Dugdale, *op. cit.*, p. 16.

[2] McCulloch, *Tribe of Ishmael.*

[3] Joerger, "Die Familie Zero." Reviewed by Gertrude C. Davenport, in the *American Journal of Sociology*, Nov., 1907.

were criminals. Fifty-two were of illegitimate birth. Although some are counted in more than one category, the record is appalling. In this family however, the marriages were nearly all with foreign women, and the effect of consanguinity was only the intensification of the neurosis in the first two generations.

Dr. Bemiss found that 300 or 7.7 per cent of the offspring of consanguineous marriages were subject to scrofula.[1] This is a disease which is almost universally recognized as hereditary, and which we should therefore expect to find intensified by double heredity. But 7.7 per cent is obviously too high; otherwise most of the scrofulous must be the offspring of marriages of kindred. About one per cent of the children of my own correspondence cases were reported as scrofulous. And while the United States Census reports but 3.9 per cent of the blind as the offspring of consanguineous marriages, the percentage of the blind from scrofula is 6.1.[2] The blind from scrofula of consanguineous parentage were 2.8 per cent of all the blind of consanguineous parentage, while all the blind from scrofula were 1.8 per cent of all the blind. Consanguinity, then, seems appreciably to intensify scrofula, but there is no indication that scrofula is ever caused by parental consanguinity.

[1] Bemiss, see *Trans. of Am. Med. Asso.*, vol. xi, 1858, p. 420.

[2] *The Blind and the Deaf.* Special Report of 12th Census, 1906.

CHAPTER V

Consanguinity and Mental Defect

Idiocy, perhaps more than any other disease or defect, has long been connected in the popular mind with the marriage of cousins. This fact is not surprising when we consider that until very recent times idiots were looked upon with a kind of superstitious awe, and the affliction was supposed to be a curse of God. For this reason, when idiocy did follow consanguineous marriage as it sometimes would, it was believed to be the fit punishment of some violation of divine law. Insanity also frequently has been attributed to consanguineous marriage, but not so frequently as idiocy, since its occurrence later in life is not so obviously connected with pre-natal conditions.

The terminology of mental and nervous disorders has been so loosely applied that some definition may be necessary. By the term "idiocy," is meant a condition of undeveloped mentality. Idiocy exists in various degrees, from the complete absence of intellectual faculties to a condition of mere irresponsibility in which the subject is capable of self-help, and sometimes of self-support under the careful guidance of other. Under the generic term "idiot" may be included the "complete idiot," the imbecile, the "feeble-minded" and the "simpleton," all of whom suffer in a greater or less degree from arrested mental development.

Insanity, on the other hand, is a disease which destroys or clouds an intellect which has once been developed.

It is true that certain conditions of idiocy and imbecility do resemble that phase of insanity known as dementia—a reversion to the original mental state of childhood — in reality a form of second childhood. But the states are not identical, although one may lapse into the other. One is defect, the other disease; the imbecile in the former being the counterpart of the dement in the latter, just as the moral imbecile is the analogue of the paranoiac.[1]

Of the strong inheritability of idiocy there can be no doubt. Dr. Martin W. Barr of the Pennsylvania Training School for Feeble Minded Children has published an etiological table embodying the results of a careful examination of 4050 cases of mental defect. Of these, 2651 or 65.45 per cent resulted from causes acting before birth, including 1030 or 25.43 per cent with a family history of idiocy and imbecility, and 529 more (13.06 per cent) with a family history of insanity, epilepsy and minor neuroses. Dr. Barr gives many instances illustrating the heredity of imbecility, especially where both parents were imbeciles, and had imbecile relatives. One case in particular forcibly illustrates the disastrous results of the marriage of such unfortunates. It is taken from the reports of the Connecticut Lunacy Commission:

> In one instance, where a pauper female idiot lived in one town, the town authorities hired an idiot belonging to another town, and not then a pauper, to marry her, and the result has been that the town to which the male idiot belongs has for many years had to support the pair and the three idiot children.[2]

Neuroses may remain latent for a generation and reappear

[1] Barr, *Mental Defectives*, p. 18. [2] *Ibid.*, p. 99.

in the grandchildren of the person affected, or the latent tendency may never reappear unless some disturbing factor such as scarletina, meningitis or other acute disease attacks the weak spot. This possibility suggests that the influence of heredity may be vastly greater than the etiological tables would indicate. The apparent causes may be only agents which assist in developing the evil really engendered by an inheritance of imbecility.

It is not at all certain that there is any well marked boundary line between genius and some forms of imbecility. Many quite irresponsible idiots have marvelous verbal memories, and can repeat parrot-like, page after page of books of which they have no comprehension. Dr. Barr tells of cases of prodigies, musical, mathematical and mechanical, who except in their specialty were almost totally deficient mentally.[1] Many of the world's most brilliant musicians, mathematicians and even military leaders have been men of one-sided mental development, whose ability in other lines was so slight that they were little better than imbeciles, and it is not at all surprising that their children are sometimes truly idiotic.

The best writers of the present day no longer recognize consanguinity as a cause *per se*, of idiocy. The heredity of neuroses, however, is so strongly established that few would dispute the proposition that where the morbidity is inherited through both parents it appears more frequently and in a more marked degree than where one parent is entirely free from taint. This is what occurs when a consanguineous marriage takes place between descendants of a neurotic family. The percentage of idiotic children would then be somewhat higher from consanguineous marriages than from the average marriage purely through the action of the laws of heredity.

[1] Barr, *op. cit.*, p. 301 *et seq.*

Dr. Barr finds 49 out of 4050 cases of idiocy or 1.21 per cent, in which there was a family history of consanguinity. This is little higher than the average frequency of first cousin marriage, and an analysis of 41 of these cases does not show one case that can be attributed to consanguinity alone. To quote: "Two were the result of incestuous connection—one of brother and sister, the other of father and daughter, and in the others there was an undoubted history of grave neuroses." [1] "Beach and Shuttleworth find in the consideration of their 100 cases (out of 2,380 idiots), giving 4.2 per cent (of consanguineous parentage) that the bad effects are due rather to the intensification of bad heredity common to both parents." [2]

Dr. Arthur Mitchell examined all idiots in nine counties of Scotland and found that 42 out of 519 or 8.1 per cent of whom the parentage was known, were children of first cousins.[3] Dr. Down found 46 out of 852 or 5.4 per cent to be children of first cousins.[4] Dr. Grabham of the Earlswood Idiot Asylum in Surrey, England, stated that 53 out of 1388 patients were the offspring of first cousins. The facts, he adds, were obtained from the parents and are "therefore tolerably trustworthy." [5] Other investigations give percentages as follows: Kerlin, 7; Rogers, 3.6; Brown, 3.5 and C. T. Wilbur, 0.3. [6]

The earlier American writers, Drs. Howe and Bemiss, believed that consanguinity was a cause of idiocy. Dr. Howe inquired into the parentage of 359 idiots and found that in 17 families the parents were nearly related; in one of these

[1] Barr, *op. cit.*, p. 94.

[2] *Ibid.*, p. 109.

[3] Darwin, see *Jour. Stat. Soc.*, p. 173.

[4] Huth, *Marriage of Near Kin*, pp. 210-211.

[5] Darwin, *op. cit.*, p. 166.

[6] Barr, *op. cit.*, p. 109.

cases there were 5 idiotic children; in 5 families there were 4 idiots each; in 3 families 3 each; in 2 families 2 each; and in 6 families 1 each. In all 17 families there were 95 children of whom 44 were idiots, 12 were scrofulous and puny, 1 was deaf, 1 dwarf—58 in low health or defective, and only 37 fairly healthy. These of course are selected cases and do not indicate at all, as Dr. Howe supposed, that consanguinity was the cause of the disasters. He adds that in each case one or both of the parents were either intemperate or scrofulous, and that there were also other predisposing causes.[1] Dr. Bemiss found that 7.8 per cent of his 3942 children of consanguineous marriages were idiots, while but 0.7 per cent of the children of non-consanguineous parentage were idiotic.[2] A more detailed examination reveals the fact that in a large number of these, one or both of the parents were mentally defective. For example, in a marriage of double cousins the wife was "feeble minded" and the six children were of inferior mentality. In a case of first-cousin marriage the wife became insane and two of the children were idiotic. In a case of the marriage of cousins, themselves the offspring of cousins the husband was a hypochondriac, and seven children idiotic. In another marriage of the same class both parents were feeble-minded and the children idiotic. These are simply taken at random, and many others might be given. When we find also that in a majority of cases no report is given of the ancestry, it is very obvious that consanguinity alone could not have been the cause of any large proportion of the 308 cases of idiocy in the Bemiss report.

My own investigations show that out of 600 children of first cousin marriage (from correspondence) 26 or 4.3 per cent are mentally defective—10 are reported as "idiots,"

[1] Barr, *op. cit.*, p. 111. [2] Bemiss, *op. cit.*, p. 420.

13 as "weak-minded" and 3 as "imbeciles." In at least five of these cases there is evidence of bad heredity, in two others the father was intemperate and in two more causes acting after birth are mentioned.

The statistics of the insane and idiotic in Prussia presented by Mayet clearly indicate the large part which heredity plays in the production of mental disorders. Tables XX and XXI set forth the most important results of his work. Mayet considers a case hereditary if any near relative of the subject suffered from mental or nervous disorder, or was intemperate, suicidal, criminal or eccentric.[1]

TABLE XX.

	No. of Cases.	*Percentage hereditary.*
1. Simple Insanity	102,097	31.7 = 100
Consanguineous parentage	664	69.0 = 218
Parents cousins	595	68.1 = 215
Parents uncle and niece	66	77.3 = 244
2. Paralytic Insanity	22,936	17.6 = 100
Consanguineous parentage	95	45.3 = 257
Parents cousins	87	44.8 = 255
Parents uncle and niece	8	75.0 = 426
3. Epileptic Insanity	14,067	25.6 = 100
Consanguineous parentage	79	53.2 = 208
Parents cousins	70	50.0 = 195
Parents uncle and niece	9	66.7 = 261
4. Imbecility and Idiocy	16,416	28.7 = 100
Consanguineous parentage	237	43.0 = 150
Parents cousins	211	43.1 = 150
Parents uncle and niece	26	38.5 = 134

Table XXI gives the proportion of the mentally defective who are the offspring of consanguineous marriages. The

[1] Mayet, *Verwandtenehe und Statistik*, quoted by Feer, *Der Einfluss der Blutsverwandschaft der Eltern auf die Kinder*, p. 13.

term "cousin" in both these tables probably means first cousins. It will be remembered that Prussian statistics of consanguineous marriages are very imperfect, but that at least 6.5 in every thousand are consanguineous (first cousins or nearer).

TABLE XXI.[1]

Parentage of Mental Defectives in Prussia.

	Consanguineous.	*Cousins.*	*Uncle and Niece.*
1. Insanity (simple)	6.5*	5.8*	.64*
Hereditary	14.2	12.5	1.6
Not hereditary	3.0	2.7	.22
2. Paralytic Insanity	4.1	3.8	.35
Hereditary	11.1	9.6	1.48
Not hereditary	2.9	2.5	.11
3. Epileptic Insanity	5.6	4.9	.64
Hereditary	11.7	9.9	1.57
Not hereditary	3.5	3.2	.29
4. Idiocy and Imbecility	14.4	12.8	1.58
Hereditary	21.6	19.3	2.12
Not hereditary	11.5	10.2	1.37

*Per thousand.

From these tables we may infer that consanguinity influences idiocy far more than it does insanity, but it is not entirely clear why the number of hereditary cases should be relatively smaller among the idiotic. Since insanity is more likely to have some more definitely assignable cause than idiocy, we should expect the percentage due to heredity to be lower and consequently the influence of consanguinity less.

It is generally admitted that a tendency toward insanity is inheritable, and it seems probable that this tendency as well as other neuroses may be intensified through double

[1] Feer, *op. cit.*, pp. 13-14.

heredity. A case in point can be found in the Shattuck genealogy.[1] For four generations in the S. family there is no indication of neurosis. The average number of children to a family had been eight, few children died young and all were prosperous farmers. But in 1719 J. S. married E. C. and their son Z. S. is thus described: "He was sometimes subject to depression of spirits; and some peculiar traits of character in a few branches of his family seem to have originated with him." He married A. C., a niece of his mother. They both lived to be over 80 and had ten children, of whom three were insane; only six married, and of these only two are known to have left surviving children. One of these a daughter, S. S., married E. S., a nephew of her father, and himself the offspring of a second cousin marriage within the S. blood. E. S. and S.S. had five children, all of whom married, and there is no further mention of insanity. We may suppose, then, that the C. stock was neurotic, and that a consanguineous marriage within that stock, although of the S. surname, intensified the tendency into insanity, but with a further infusion of the normal S. blood the morbidity was eliminated. It is very evident that the heredity and not the consanguinity was the cause of these three cases of insanity.

[1] *Shattuck Memorials*, p. 118.

CHAPTER VI

Consanguinity and the Special Senses

The most important source for this chapter is the special report on the Blind and the Deaf in the Twelfth Census of the United States.[1] This report was prepared under the direction of Dr. Alexander Graham Bell, as Expert Special Agent of the Census Office.

The enumerators of the Twelfth Census reported a total of 101,123 persons as blind, and to each of these Dr. Bell addressed a circular of inquiry. By this method he obtained verified returns of 64,763 cases of blindness in continental United States or 85.2 per 100,000 of the total population. In the same way he obtained data in regard to 89,287 persons with seriously impaired powers of hearing, or 117.5 per 100,000 of the total population.

In each case the following questions among others were asked: "Were his (or her) parents first cousins? If not first cousins were they otherwise related by blood to each other, before their marriage? Were any of his relatives blind? If yes, what relatives? (Father, mother, grandparents, brothers, sisters, uncles, aunts, and how many of each, so far as known)." The results of this inquiry give us the best and most reliable statistical material which has ever been compiled on any phase of the problem of consanguineous marriage. The investigation of the deaf was similar to that of the blind, but even more complete.

[1] U. S. Census, 1900, *Special Report on the Blind and the Deaf.*

1. The Blind. The question as to the relationship of the parents was answered in 56,507 cases, in 2,527 or 4.47 per cent of which the parents were reported as cousins. Of the 57,726 who answered the question in regard to blind relatives, 10,967 or 19 per cent replied in the affirmative.[1] The blind relatives were divided into two groups: (a) blind brothers, sisters or ancestors, and (b) blind collateral relatives or descendants. Table XXII concisely expresses the results most fundamental for this study.

TABLE XXII.

Consanguinity of Parents.	Totals.	Having blind relatives. Class (a).*	Having blind relatives. Class (b).*	Having no blind relatives.	Not Stated.
The blind	64,763	8,629	2,338	46,759	7,037
Totally blind	35,645	4,378	1,215	26,349	3,703
Partially blind	29,118	4,251	1,123	20,410	3,334
Parents cousins.—The blind	2,527	844	149	1,456	78
Parents cousins.—Totally blind	1,291	435	78	739	39
Parents cousins.—Partially blind	1,236	409	71	717	39
Parents not cousins.—The blind	53,980	7,395	2,095	43,368	1,122
Parents not cousins.—Totally blind.	29,892	3,720	1,090	24,541	541
Parents not cousins.—Partially blind	24,088	3,675	1,005	18,827	581
Consanguinity not stated.—The blind	8,256	390	94	1,935	5,837
Consanguinity not stated.—Totally blind	4,462	223	47	1,069	3,123
Consanguinity not stated.—Partially blind	3,794	167	47	866	2,714

*Symbols for Blind Relatives—(a) blind brothers, sisters or ancestors; (b) blind collateral relatives or descendants.

[1] U. S. Census, 1900, *op. cit.*, p. 16.

Of the 2527 blind persons whose parents were cousins, 993 or 39.3 per cent have blind relatives, 33.4 per cent having blind brothers, sisters or ancestors, and 3.9 per cent having blind collateral relatives or descendants. And 9 per cent of the blind who have blind relatives are of consanguineous parentage, while but 3.1 per cent of the blind who have no blind relatives are the offspring of cousins. These figures alone indicate a decided intensification of blindness through consanguinity, although it should be remembered that a relationship "works both ways," so that when a brother has a blind sister, the sister would have a blind brother. This fact has probably diminished the apparent number of sporadic cases of blindness.

Considered with reference to the degree of blindness the table shows that 1291 or 51.1 per cent of the blind of consanguineous parentage are totally blind, and 1236 or 48.9 per cent are partially blind. Among those whose parents were not cousins, 55.4 per cent were totally and 44.6 per cent were partially blind.

Of the 2527 blind of consanguineous parentage, 632 or 25.0 per cent were congenitally blind, of whom 350 or 55.4 per cent also had blind relatives of the degrees specified. Not counting those who did not answer the question in regard to blind relatives, we have 615 cases of which 51.5 per cent had blind relatives of class (a), and 5.4 per cent blind relatives of class (b). Taking the 53,980 blind whose parents were not so related the number of congenitally blind was 3666 or but 6.8 per cent, of whom 1023 or 27.9 per cent had blind relatives. Omitting as before the "blind relatives not stated," we have 23.4 per cent who had blind relatives of class (a), and 4.3 per cent relatives of class (b).

On the hypothesis that consanguinity in the parents intensifies a tendency toward blindness we should expect to find among the congenitally blind a larger proportion of

consanguineous parentage than among those blind from specific causes. In Table XXIII a general classification of the causes of blindness is given together with the consanguinity of parents. Specific causes in which the percentage of consanguinity differs in a marked degree from the average, are given parenthetically.

TABLE XXIII.

Cause of Blindness.	Total.	Consanguinity of Parents.			Percentages.		
		Cousins.	Not cousins.	Not stated.	Cousins.	Not cousins.	Not stated.
Total	64,763	2,527	53,980	8,256	3.9	83.4	12.7
Opacity of the eye	33,930	1,000	28,797	4,133	2.9	84.9	12.2
a. Causes affecting cornea	11,380	444	10,016	920	3.9	88.0	8.1
(1) Measles	1,451	73	1,267	111	5.0	87.4	7.6
(2) Scrofula	1,165	71	1,026	68	6.1	88.1	5.8
b. Causes affecting iris	1,307	33	1,093	181	2.5	83.6	13.9
c. Causes affecting lens	11,769	228	9,467	2,074	1.9	80.4	17.7
d. Other causes	9,474	235	8,221	1,018	2.5	86.8	10.7
Nervous apparatus affected	7,944	276	6,980	688	3.5	87.8	8.7
Unclassified	14,885	938	12,463	1,484	6.3	83.7	10.0
(1) Congenital	4,728	632	3,666	430	13.4	77.5	9.1
(2) Other causes	10,157	306	8,797	1,054	3.0	86.6	10.4
Unknown	8,004	313	5,740	1,951	3.9	71.7	24 4

To quote from the Report:

The only specific causes, other than congenital, to which is due a greater proportion of the total cases of blindness among those whose parents were cousins than among those whose parents were not related, are: Catarrh (parents cousins 28.1,

parents not cousins 8.7 per 1,000), scarlet fever (parents cousins 10.7, parents not cousins 10.1 per 1,000), scrofula (parents cousins 28.9, parents not cousins 19 per 1,000), and measles (parents cousins 28.9, parents not cousins 23.5 per 1,000). The difference in these proportions is but slight, and the relative number of cases of blindness attributed to each of the other causes is greater among those whose parents were not related.[1]

It will be noted that the greatest proportion is in the case of scrofula.

Since it is probable that a part of those who did answer the question as to consanguinity are in fact the offspring of cousins, the percentage in each case should be somewhat increased. Allowing for these the same proportion as for those who did answer the question we should have of all the blind 4.47 per cent as the offspring of cousins; of the totally blind 4.14 per cent and of the partially blind 4.88. While of the congenitally blind we should have 14.7 per cent as offspring of cousins.

It is interesting to note in this connection that in 1900, Dr. Lee Wallace Dean, of the University of Iowa examined the 181 blind children in the Iowa College for the Blind, and found that 9 or nearly 5 per cent were the offspring of first cousin marriages.[2] Dr. Dean cintinues,

If we exclude from the list those blind children who were blind because of blennorrhea neonatorum, sympathetic opthalmia, trachoma, etc., and consider only those who suffered because of congenital conditions, we should find that 14 per cent were the result of consanguineous marriage of the first

[1] U. S. Census, 1900, *op. cit.*, p. 17.

[2] *Effect of Consanguinity upon the Organs of Special Sense*, p. 4.

degree. . . . Among the pupils who have entered the college since 1900 the percentage is about the same.

This was written in 1903, three years before the publication of Dr. Bell's report.

Statistics from foreign sources give even larger percentages of the blind as the offspring of consanguineous marriage. Dr. Feer quotes fourteen distinct investigations of the etiology of retinitis pigmentosa, embodying in all 621 cases, of which 167 or 27 per cent were the offspring of consanguineous parents.[1] Retinitis pigmentosa is perhaps more generally attributed to consanguineous marriage than any other specific disease of the eye, and it is to be regretted that the Census report does not give any data in regard to this cause. Retinitis pigmentosa in known to be strongly inheritable, as is albinism and congenital cataract.

Looking now at the other side of the problem, that of the probability of consanguineous marriages producing blind offspring, we have as our data the 2527 blind whose parents were cousins, and a conservative estimate which may be made from the data in Chapter II that 1,000,000 persons in continental United States are the offspring of cousins within the degrees included in the Census report.[2] In the general population 852 per million are reported as blind, and 63 per million as congenitally blind. The actual figures for the offspring of cousin marriages are 2527 per million for all blind and 632 per million for the congenitally so. In other words only 0.25 per cent of the offspring of cousin marriages are blind and only 0.05 per cent are con-

[1] *Der Einfluss der Blutsverwandschaft der Eltern auf die Kinder*, p. 14.

[2] From 1½ to 2 per cent of all marriages were found to be between cousins within the degree of second cousins, and cousin marriages were found to be normally fertile.

genitally blind. Although the probability that a child of related parents will be born blind is ten times as great (632 per million vs. 63 per million) as when the parents are not related, the numbers are so small that there seems to be very little basis for a belief that consanguinity does more than to intensify an inherited tendency, especially since over one half of the congenitally blind of consanguineous parentage are known to have blind relatives.

2. The Deaf. The extent to which the connection between consanguineous marriage and deaf-mutism has been studied is indicated by a table given by Mr. Huth, in which are set forth the results of fifty distinct investigations.[1] In this table the percentages of deaf-mute offspring of consanguineous marriage to the total number of deaf-mutes investigated, varies from 30 per cent to none at all. Of these studies not more than ten or eleven have the slightest statistical value, and four of these—the most reliable—are from the reports of the Census of Ireland in the years 1851, 1861, 1871 and 1881.

The Irish censuses of 1891 and 1901 give similar data, though not so detailed as in 1871 and 1881. Thus we have in these reports a census inquiry into a phase of the consanguineous marriage problem extending over the period of six successive censal years. Although we can hardly suppose that these figures are accurate in all respects, they throw a great deal of light upon the problem, and are worth quoting in some detail. The tables as given by Mr. Huth contain a number of errors of detail, the correction of which changes the results materially.[2]

[1] *Marriage of Near Kin*, p. 229.

[2] In a subsequent article Mr. Huth corrects some of these errors. See "Consanguineous Marriage and Deaf-mutism," *The Lancet*, Feb. 10, 1900.

TABLE XXIV.

Censal year.	Total population.	Congenital deaf-mutes.					
		Number.	Number per million.	Average number to a family.*	Parents cousins.		
					Number.	Per cent.	Average number to a family.*
1851†.....	6,574,278	4,127	628	——	242	5.86	1.66
1861.....	5,798,967	4,096	706	1.22	362	8.84	1.72
1871.....	5,412,377	3,503	647	1.30	287	7.35	1.76
1881.....	5,174,836	3,163	611	1.32	191	6.04	1.69
1891.....	4,706,448	2,570	546	1.40	297	11.56	1.92
1901.....	4,456,546	2,179	489	1.40	249	11.43	1.73

* From Table XXV. † 1851 data from Huth, "Consanguineous Marriage and Deaf-mutism," *The Lancet*, 1900.

Table XXIV summarizes the most important points in the Irish data. It will be seen that while there has been an absolute diminution in the number of deaf-mutes in Ireland with the decrease in population, there has been a relative increase of deaf-mutism. There are two possible explanations for this phenomenon, both of which may have operated in part; first that in the great emigration the deaf-mutes have been left behind, and second that with the introduction of improved methods of census taking, the returns are more complete than a half century ago. Mr. Huth believes that there is still room for improvement in Irish census methods, and thinks there is reason to believe that in the enumeration of the deaf all children born deaf in a family are included whether living or not.

Since Ireland is strongly Roman Catholic, the proportion of consanguineous marriages is probably small, so that the percentage of deafmutes derived from consanguineous marriages, varying from 5.86 to 11.56 is very much greater than the percentage of these marriages in the general population. The average number of deaf children to a family in Table XXIV varies less than any other part of the table, and clearly shows a much higher average number of deaf children where the parents were cousins. They reveal the interesting fact that the occurrence of two or more deaf-mutes in a family is more than twice as probable where the parents are related as where they are not. Table XXV still better illustrates this point. Of the families where there was but one deaf-mute, only 4.3 per cent were the offspring of cousin marriages; where there were two in a family 12.9 per cent were of consanguineous parentage; three in a family, 13.3 per cent; four in a family, 19.0 per cent; more than four in a family, 21.1 per cent.

TABLE XXV.

Number of Congenital Deaf mutes to a Family in Ireland.

Year.	Parentage.	Families in which deaf-mutes numbered.										
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1861	Parents cousins	127	45	20	10	5	2	..	1	..	...	...
1871	Parents cousins	91	38	24	5	3	1	1	..	..	...	...
1881	Parents cousins	63	30	13	6	1	..	..	..	..	...	...
1891	Parents cousins	82	38	19	9	1	3	1	2	..	...	...
1901	Parents cousins	79	34	23	7	1	..	1	..	..	...	...
1861	All families *	2963	347	158	35	13	5	..	1	..	...	...
1871	All families *	2460	305	167	47	20	5	1	..	..	...	...
1881	All families *	2080	281	162	39	18	6	..	..	..	1	...
1891	All families *	1473	273	134	40	12	6	1	2	..	...	1
1901	All families *	1219	231	122	34	10	4	2	..	..	...	...

* Number of the "Deaf and Dumb" to a family, "as far as could be ascertained."

In 1871 and 1881 the inquiry was more minute and the degrees of consanguinity were specified. Mr. Huth quotes some of the figures for these years, probably derived from the same sources as Table XXVI, and comments as follows: "An examination of this table will show that the statistics so much relied upon as proving the causation of deaf-mutism by consanguineous marriages show nothing of the sort. In 1871 fourth cousins produced more deaf-mutes per marriage than any nearer relationship. In 1881 third cousins produced more than any nearer relationship." [1] Mr. Huth forgets that he is basing these statements on five and nine families respectively, and does not take into consideration the probability that if the returns are biased, as he suspects, this bias would affect the more distantly related, relatively more than the first cousin marriages, for the same reason that this would be true of the cases collected by Dr. Bemiss.[2] Combining the figures of the two censal years helps to correct these averages, and the distantly related show approximately the same average as the first cousin marriages in spite of the vastly greater selection which must have obtained in the distantly related cases.

In Table XXVI it will be seen that 52.5 per cent of the deaf-mute offspring of consanguineous parents were the offspring of first cousin marriages. On the assumption that this percentage is fairly typical of each set of returns we may say that from three to six per cent of the Irish deaf-mutes are the offspring of first cousin marriages. If, then, the proportion of first cousin marriages is no greater than in England, the percentage of deaf-mute offspring is several times as great as in the average non-related marriage.

[1] Huth, *Marriage of Near Kin*, p. 227.

[2] *Cf. supra*, p. 42.

TABLE XXVI.

Consanguinity of Parents.	1871.			1881.			1871 and 1881.		
	Number of marriages.	Number of congenital deaf-mutes.	Average per marriage.	Number of marriages.	Number of congenital deaf-mutes.	Average per marriage.	Number of marriages.	Number of congenital deaf-mutes.	Average per marriage.
First cousins	72	128	1.78	74	123	1.66	146	251	1.72
Second cousins	50	89	1.78	29	46	1.58	79	135	1.71
Third cousins	24	40	1.67	9	21	2.33	33	61	1.85
Fourth cousins	5	11	2.20	1	1	—	6	12	2.00
Fifth and sixth cousins	12	19	1.58	not stated			12	19	1.58
Total.....	163	287	1.76	113	191	1.69	276	478	1.73
No relationship *	2,842	3,609	1.27	2,474	3,229	1.31	5,316	6,838	1.29
Grand total.....	3,005	3,896	1.30	2,587	3,420	1.32	5,592	7,316	1.31

* See Table XXV.

In Scotland Dr. Arthur Mitchell made inquiry of the superintendents of a number of deaf-mute asylums, and found that of 544 deaf-mutes, 28 were the offspring of 24 consanguineous marriages.[1] There were 504 families represented in all, so that the average per family was 1.17 among the consanguineous to 1.07 among the non-consanguineous.

In Norway, according to Uchermann, while 6.9 per cent of all marriages are consanguineous within and including

[1] Huth, *op. cit.*, p. 226.

the degree of second cousins, and in single cantons the percentages range as high as 31.0, only in one single district does the number of the deaf-mutes harmonize with that of the marriage of cousins. The district of Saeterdalen has the greatest number of consanguineous marriages (201 out of 1250), but not a single case of deaf-mutism. Hedemarken, which has the fewest consanguineous marriages has a great many deaf-mutes. Where deaf-mutism exists it seems to be intensified by consanguinity, but where it is not hereditary it is not caused by consanguinity. Of the 1841 deaf-mutes in Norway, 919 were congenitally deaf, and of these 212 or 23 per cent were of consanguineous parentage.[1]

Dr. Feer gives a table containing the results of a number of studies of deaf-mutism, which shows an average of 20 per cent as of consanguineous origin. Four investigations give the number of children to a family. Table XXVII from Feer seems to indicate that the Irish census is fairly accurate at this point.[2]

TABLE XXVII.

Average Number of Children to a Family.

Observer.	*Consanguineous marriages.*	*"Crossed" marriages.*
Huth (Irish Census)....	1.68	1.17
Wilhelmi.....	1.71	1.26
Mygind.....	1.53	1.20
Uchermann.....	1.41	1.19

In the American Census the instructions to enumerators have been so diverse that statistics of the deaf have been very poor until recent years. Not until the Twelfth Census was the inquiry put upon a really scientific basis.

[1] *Les Sourds-muets en Norvège.* Quoted by Feer, *Der Einfluss der Blutsverwandschaft der Eltern auf die Kinder*, p. 22.

[2] Feer, *op. cit.*, p 22.

This reform, as also the more intelligent attitude of the American people in general towards the affliction of deafness, is due largely to the work of Dr. Alexander Graham Bell. An enumeration of Dr. Bell's services directly, and through the agency of the Volta Bureau, in this cause, cannot be given here. For our purpose the most important of his contributions is embodied in the Special Report of the Twelfth Census of the United States already referred to.

As in the investigation of the Blind, the circular letter sent to each person reported by the enumerators as deaf contained questions in regard to parentage and the existence of deaf relatives. It is unfortunate that in these returns it is impossible to distinguish between degrees of relationship, but in such an extensive compilation it was doubtless impracticable to attempt to unravel the intricacies of consanguinity. Judging from the returns of the Census of Ireland we may assume that about half of the cases returned as "cousins" were first cousins.

The replies to the inquiry as to deaf relatives were more carefully analyzed, and were divided into four groups, which are referred to throughout as (a), (b), (c) and (d) relatives. These groups are: (a), deaf brothers, sisters or ancestors; (b), deaf uncles, aunts, cousins or other relatives not (a), (c) or (d); (c), deaf children, (sons or daughters); (d), deaf husbands or wives. Thus a large proportion of the hereditary cases would be included in the first two categories, (a) and (b).[1]

The causes of deafness are given in detail, but as might be expected the returns are not as definite or as accurate as we should desire. The causes given have been grouped under five main heads; these again are subdivided, often into divisions numerically too minute for real statistical value.

[1] U. S. Census *Report on the Blind and the Deaf*, p. 127.

Table XXVIII includes the main groups and those specific causes which number more than 3000 cases. The extreme variation in the percentages of those who are the offspring of consanguineous marriages cannot be attributed to mere

TABLE XXVIII.

Cause of Deafness.	Total.	Consanguinity of Parents.			Per cent.		
		Cousins.	Not cousins.	Not stated.	Cousins.	Not cousins.	Not stated.
Total	89,287	4,065	75,530	9,692	4.5	84.6	10.9
Affections of external ear	871	29	760	82	3.3	87.3	9.4
Affections of middle ear	34,801	1,238	30,824	2,739	3.5	88.6	7.9
Affections of internal ear	12,295	343	11,121	831	2.8	90.4	6.8
Unclassified	31,205	2,183	25,281	3,741	7.0	81.0	12.0
Unknown	10,115	272	7,544	2,299	2.7	74.6	22.7
Scarlet fever	7,424	285	6,647	492	3.9	89.5	6.6
Disease of ear	4,210	222	3,683	305	5.3	87.5	7.2
Catarrh	11,702	304	10,450	948	2.6	89.3	8.1
Colds	3,074	81	2,666	327	2.6	86.7	10.7
Meningitis	3,991	83	3,741	167	2.1	93.7	4.2
Old age	3,361	38	2,369	954	1.1	70.5	28.4
Military service	3,242	40	2,897	305	1.2	89.4	9.4
Congenital	14,472	1,710	11,322	1,440	11.8	78.2	10.0

chance. There is clearly some fundamental connection between consanguinity and congenital deafness if 11.8 per cent of all the congenitally deaf are the offspring of consanguineous marriages, while of the adventitiously deaf but 3.1 per cent are the offspring of such marriages. In fact we are tempted to jump at the conclusion that consanguinity is in itself a cause of deaf-mutism. Furthermore 42.1 per cent of the deaf whose parents were cousins were congeni-

tally deaf, while this was true of but 15 per cent of those whose parents were unrelated.

But on the other hand, 53.4 per cent of the deaf whose parents were cousins had deaf relatives of the (a) and (b) groups, while of those whose parents were not cousins, only 29.9 per cent in these groups had deaf relatives. In Table XXIX the close connection between deaf relatives of these groups and consanguinity is shown. For the sake of simplicity no account is taken of (c) relatives (deaf children), and (d) relatives (deaf husbands or wives), for in the first case only 370 deaf are reported as having deaf children and at the same time no (a) or (b) relatives, and in the second case (d) relatives are not ordinarily blood relatives at all.

TABLE XXIX.

Class of Deaf Relatives.*	Total.	Consanguinity of Parents.			Per cent.		
		Cousins.	Not cousins.	Not stated.	Cousins.	Not cousins.	Not stated.
Total	89,287	4,065	75,530	9,692	4.6	84.6	10.6
Stated	80,481	3,911	73,639	2,931	4.9	91.5	3.6
Not stated	8,806	154	1,891	6,761	1.7	21.5	76.8
(a) relatives	21,660	1,850	18,838	972	8.5	87.0	4.5
No (a) relatives	58,821	2,061	54,801	1,959	3.5	93.2	3.3
(a) or (b) relatives	25,851	2,171	22,552	1,128	8.4	87.2	4.4
(a) and (b) relatives	4,117	412	3,587	118	10.0	87.1	2.9
(a) but no (b) relatives	17,543	1,438	15,251	854	8.2	86.9	4.2
(b) but no (a) relatives	4,191	321	3,714	156	7.7	88.6	3.7
No (a) or (b) relatives	54,630	1,740	51,087	1,803	3.2	93.5	3.3

*Symbols for deaf relatives: (a) deaf brothers, sisters and ancestors; (b) deaf uncles, aunts, cousins, etc.

Table XXIX shows unmistakably that the connection between consanguinity and hereditary deafness is very close. Where there is the largest amount of deafness in the family the percentage of consanguinity is the highest. That is, of those who had both (a) and (b) relatives ten per cent were the offspring of cousins, while of those who had neither (a) nor (b) relatives only three per cent were the offspring of cousins. It is natural to assume that as a rule where the deaf have either (a) or (b) deaf relatives, deafness is hereditary, for the probability of two cases of deafness occurring in the same family, uninfluenced by heredity would be very small. It is likely also that a great many of the deaf who stated that they had no deaf relatives were mistaken, for few people are well enough informed in regard to their ancestry to answer this question definitely. Not one man in thousands can even name all of his great-grandparents, to say nothing of describing their physical or mental traits. Others may have understood the inquiry to refer only to living relatives and therefore have omitted almost all reference to their ancestors. These possible errors might easily explain all the excess of the percentage of consanguinity among those reported as having no deaf relatives over the the probable percentage of consanguineous marriage in the general population. But this very probability that comparatively few deaf ancestors have been reported increases the probability that the greater part of the (a) relatives were brothers and sisters rather than ancestors. Now of the 26,221 deaf having deaf relatives, 17,345 have only (a) relatives, and if these are largely living brothers and sisters the relationship would "work both ways," so that if there were two deaf children in a family, each would have an (a) deaf relative. In the Census of Ireland figures above quoted it will be remembered that among families which were the offspring of cousins the proportion having two or

more deaf children was three times as great as among those who were not the offspring of consanguineous unions. If this follows in America it largely accounts for the high percentage of the congenitally deaf who are the offspring of cousin marriages, and especially of those who have (a) deaf relatives.

TABLE XXX.

Class of Deaf Relatives.*	Total.	Consanguinity of Parents.			Per cent.		
		Cousins.	Not cousins.	Not stated.	Cousins.	Not cousins.	Not stated.
Total	14,472	1,710	11,322	1,440	11.8	78.2	10.0
Stated	13,428	1,647	11,110	671	12.3	82.7	5.0
Not stated	1,044	63	212	769	6.0	20.3	76.7
(a) relatives	5,295	986	3,961	348	18.6	74.8	6.6
(b) and (c) but no (a) relatives.	850	126	686	48	14.6	79.8	5.6
No (a), (b) or (c) relatives	7,273	535	6,463	275	7.3	88.9	3.8

*Symbols for deaf relatives: (a) deaf brothers, sisters or ancestors; (b) deaf uncles, aunts, cousins, etc.; (c deaf children.

A further analysis of the congenitally deaf according to consanguinity of parents and deaf relatives, as in Table XXX, helps to determine to what extent the greater number of deaf children to a family among the offspring of consanguineous marriages has influenced the totals. From the report it cannot be determined how many of the congenitally deaf had (a), (b) or (c) relatives alone, but the existence of (b) and (c) relatives would almost certainly indicate that

the deafness was hereditary. Of these 14.6 per cent were the offspring of cousins, while of those having (a) relatives 18.6 per cent were the offspring of consanguineous unions. Thus it would seem to be a more reasonable conclusion that where two or more deaf-mutes appear in the same family, at least a tendency toward deaf-mutism is hereditary in the family and is intensified by the marriage of cousins, rather than that consanguineous marriage is in itself a cause. The fact that in many cases the relationship would " work both ways " would not greatly affect the percentage of the offspring of cousins having (b) and (c) relatives, for the chance would be slight that the (b) or (c) relative would be himself the offspring of a consanguineous marriage. Among the congenitally deaf who reported no deaf relatives the percentage of consanguineous parentage is still high, (7.3 per cent), but this excess can easily be accounted for by the ignorance of deaf relatives on the part of the informant, without contradicting the hypothesis of heredity.

Basing now our percentages on the totals of consanguineous and non-consanguineous parentage respectively, and including only those who answered the inquiry as to deaf relatives, it will be seen (Table XXXI) that while of all the deaf less than one third are returned as having deaf relatives, of the deaf who were the offspring of cousins over one half (55.5 per cent) were returned as having (a) or (b) deaf relatives.

Again taking into consideration only the congenitally deaf the results are still more striking. Table XXXII shows that 66.5 per cent of the congenitally deaf who are of consanguineous parentage are known to have deaf relatives.

TABLE XXXI.

Class of Deaf Relatives.	Total.	Consanguinity of Parents.		Per cent.		
		Cousins.	Not cousins.	Total.	Cousins.	Not cousins.
Deaf relatives stated	80,481	3,911	73,639	100.0	100.0	100.0
(a) relatives	21,660	1,850	18,838	26.9	47.3	25.5
No (a) relatives	58,821	2,061	54,801	73.1	52.7	74.5
(a) or (b) relatives	25,851	2,171	22,552	32.1	55.5	30.6
(a) and (b) relatives.....	4,117	412	3,587	5.1	10.5	4.8
(a) and no (b) relatives.....	17,543	1,438	15,251	21.8	36.8	20.7
(b) and no (a) relatives.....	4,191	321	3,714	5.2	8.2	5.1
No (a) or (b) relatives	54,630	1,740	51,087	67.9	44.5	69.4

Symbols for deaf relatives: (a) deaf brothers, sisters or ancestors; (b) deaf uncles, aunts, cousins, etc.; (c) deaf children; (d) deaf husbands or wives.

TABLE XXXII.

Class of Deaf Relatives.	Total.	Consanguinity of Parents.		Per cent.		
		Cousins.	Not cousins.	Total.	Cousins.	Not cousins.
Deaf relatives stated	13,428	1,647	11,110	100.0	100.0	100.0
(a) relatives	5,295	986	3,961	39.5	59.9	35.6
(b) or (c), no (a) relatives.....	860	126	686	6.4	7.6	6.2
No (a), (b) or (c) relatives....	7,273	535	6,463	54.2	32.5	58.2

Symbols for deaf relatives: (a) deaf brothers, sisters or ancestors; (b) deaf uncles, aunts, cousins, etc.; (c) deaf children.

The percentage having (a) relatives, including brothers and sisters, is nearly twice as great among the deaf of consanguineous parentage as among the offspring of unrelated parents. This is not inconsistent with the Irish returns which show the average number of deaf children to a family to be so much greater where the parents were cousins, than where they were not.

The statistics of the (c) relatives, or deaf sons and daughters of the deaf, are not very full. Of the 31,334 married deaf who answered the inquiry in regard to deaf relatives, 437 or 1.4 per cent reported deaf children and 30,897 or 98.6 per cent reported no deaf children. Of the totally deaf 2.4 per cent had deaf children, and of the congenitally deaf 5.0 per cent. The percentage of deaf children varied greatly according to the number and class of deaf relatives, as shown by Table XXXIII.

TABLE XXXIII.

Class of Deaf Relatives.	Percentage having deaf children.			
	Total.	Totally deaf.	Partially deaf.	Congenitally deaf.
(a), (b) or (d)	1.4	2.4	1.1	5.0
(d)	3.2	3.3	2.6	6.4
No (d)	1.1	1.4	1.0	2.5
(a) and (d)	6.3	6.7	4.3	7.8
(d), but no (a)	2.2	2.2	2.0	4.9
(a), but no (d)	1.4	2.3	1.3	2.6
No (a) or (d)	0.9	1.0	0.9	2.3
(a), (b) and (d)	9.5	9.9	*	9.0
(a), (d), but no (b)	5.5	5.9	3.6	7.4
(b), (d), but no (a)	2.5	2.4	*	*
(d), but no (a) or (b)	2.2	2.2	2.0	5.2
(a), (b), but no (d)	1.9	3.1	1.7	*
(a), but no (b) or (d)	1 3	2.1	1.2	2.8
(b), but no (a) or (d)	1.0	1.6	1.0	*
No (a), (b) or (d)	0.9	1.0	0.9	2.6

* Percentages not given where base is less than 100.

Symbols: (a) deaf brothers, sisters or ancestors; (b) deaf uncles, aunts, cousins, etc.; (d) deaf husbands or wives.

The striking feature of these percentages is the regularity with which they increase in proportion as the number of deaf relatives increases, until among the 242 persons who have (a), (b) and (d) relatives, 23 or 9.5 per cent also have (c) relatives. A consanguineous marriage within a family tainted with deafness would have the same effect as doubling the number of deaf relatives, which as we have seen greatly increases the percentage having deaf children.

It would seem that the number of the married deaf reported as having deaf children is much too small, especially since Dr. Fay [1] produces statistics of 4471 marriages of the deaf of which 300 produced deaf offspring. Counting only the 3,078 marriages of which information in regard to offspring was available these figures show an average of a little less than one such marriage in ten as productive of deaf offspring. The total number of children of these marriages was 6,782, of which 588 were deaf. These 3,078 marriages represented 5,199 deaf married persons as compared with the 31,334 reported in the Twelfth Census, or about one sixth. Increasing the 300 families who had deaf children in the same ratio we have 1800 as compared with the 437 reported by the census. But as it was inevitable that Dr. Fay's cases should be selected somewhat, he has probably collected records of more than one sixth of all the cases where deaf children were born of deaf parents. But we can hardly believe that he found three-fourths of such cases. The true number therefore must be considerably greater than 437, but less than 1800.[2]

Dr. Fay found that 31 out of the 4,471 marriages of the deaf were consanguineous, but he expresses the belief that the

[1] *Marriages of the Deaf in America*, chap. v.

[2] Of the 17 children of first cousins reported on my circulars as either totally or partially deaf, 9 are known to have had deaf ancestors.

actual number and percentage of consanguineous marriages of the deaf are larger. The following table which combines several of Dr. Fay's tables sets forth the main results of his work. In each instance one or both parties to the marriage were deaf. The totals include only those of whom information as to the offspring was available.

TABLE XXXIV.

Consanguineous Marriages of the Deaf.	Number of marriages.	Marriages resulting in deaf offspring.		Deaf children.		
		Number.	Per cent.	Number	Number deaf.	Per cent deaf.
First cousins	7	4	57.	26	7	27.
Second cousins	5	3	60.	25	10	40.
Third cousins	1	1	—	1	1	—
"Cousins"	14	3	21.	36	7	19.
Nephew and aunt	1	1	—	4	3	75.
Distantly related	3	2	67.	8	2	25.
Total consanguineous	31	14	45.	100	30	30.
Not consanguineous, or no information	3,047	286	9.	6,682	558	8.
Grand total	3,078	300	10.	6,782	588	9.

Obviously percentages based on these figures are of little value of themselves, especially since Dr. Fay's cases are not entirely typical, but in general this table points us to the same conclusion that we have reached by other means,

namely that where a tendency toward deafness exists, a consanguineous marriage is more likely to produce deaf children than a non-consanguineous marriage. If more figures were available the percentage of deaf children would probably increase with the nearness of consanguinity and the number of deaf relatives, but with the present data a further analysis has no significance.[1]

If, then, consanguineous marriages where relatives are deaf have a greater probability of producing deaf offspring, and also a greater probability of producing plural deaf offspring, than ordinary marriages, and two thirds of the congenitally deaf offspring of consanguineous marriages do have deaf relatives, it does not seem necessary to look beyond the law of heredity for an explanation of the high percentage of the congenitally deaf who are of consanguineous parentage.

In those cases of deafness which, in the Census returns, are ascribed to specific causes, the factor of consanguinity is still noticeable, although the percentage of the non-congenitally deaf who are the offspring of cousins never exceeds 5.3 (Table XXVIII). But the influence of heredity is not removed by the elimination of the congenitally deaf. Many instances are known where successive generations in the same family have developed deafness in adult life, often at about the same age and from no apparent cause. The following case well illustrates this point. It is furnished me by a correspondent in whom I have great confidence. The facts are these: A—— aged

[1] Mr. Edgar Schuster (*Biometrika*, vol. iv, p. 465) finds from Dr. Fay's statistics that the average parental correlation (parent and child) of deafness is: paternal, .54; maternal, .535. English statistics of deafness give: paternal correlation, .515; maternal, .535. The fraternal correlation from the American data is .74 and from the English .70. See *infra*, p. 92.

28 married B—— aged 19, his first cousin who bore the same surname as himself. Both lived to old age and were the parents of eight children, two of whom died in infancy. My informant further states:

Having personally known very well all of the surviving six children of this family, I can truthfully state that all were unusually strong, active and vigorous people and all the parents of healthy children. A——— was troubled with deafness as long as I can remember, and this physical trait he transmitted to all of his children, though some of them did not develop the same till well along in life. C——— (the youngest son), however, began to indicate deafness quite early. No one of his four children is in the least deaf.

It will be noticed here that whereas in the case of the cousin marriage the trait was so strongly inherited, it disappeared entirely in the next generation with a non-consanguineous marriage. The inheritance of tendencies or weaknesses may be more common than the actual inheritance of defects. Dr. Bell's words on this point are suggestive:

Where a tendency toward ear trouble exists in a family, it may lie dormant and unsuspected until some serious illness attacks some member of the family, when the weak spot is revealed and deafness is produced. We are not all built like that wonderful one-horse shay that was so perfectly made in all its parts that when at last it broke down it crumbled into dust. When an accident occurs it is the weak spot that gives way, and it would be incorrect to attribute the damage to the accident alone and ignore the weakness of the part; both undoubtedly are contributing causes.

In the case, then, of a deaf person who has deaf relatives, the assigned cause of deafness may not be the only cause involved, or indeed the true cause at all. It may be the cause

simply in the same sense that the pulling of a trigger is the cause of the expulsion of a bullet from a rifle, or a spark the cause of the explosion of a gunpowder magazine; hereditary influences may be involved.[1]

It is thus possible to account for the large proportion of deafness among persons of consanguineous parentage by the simple action of the laws of heredity. Why then should we go out of our way to look for a cause of the defect in consanguinity itself? When two explanations are possible, the simpler explanation is the more probable, other factors being equal; but in the present problem the factors are not equal, for the evidence points strongly toward the simpler hypothesis of intensified heredity, while there is little or no evidence that consanguinity is a cause *per se*.

As to the probability then of a consanguineous marriage producing deaf offspring, it will readily be seen to be very slight, and in those cases where there is actually no trace of hereditary deafness in the family, perhaps no greater than in non-related marriages. While the census figures in regard to the deaf are not complete they probably include a great majority of the deaf in the United States. The 89,287 deaf would mean an average of 12 deaf persons to every 10,000 inhabitants and the 14,472 congenitally deaf, 2 persons to every 10,000. Assuming then, as before[2] that 1,000,000 persons in continental United States are the offspring of consanguineous marriages within the limits of the term "cousins" as used in the Census report, 41 out of every 10,000 persons of consanguineous parentage would be deaf, and 17 congenitally so. Thus less than one half of one per cent of the offspring of consanguineous mar-

[1] U. S. Census *Report on the Blind and the Deaf*, p. 127.

[2] *Supra*, p. 64.

riages in the United States are deaf, and only one sixth of one per cent are deaf-mutes in the commonly accepted sense of the term.

It is interesting here to quote an opinion given by Dr. Bell in 1891, as to the probable results of the consanguineous marriage of deaf persons.[1]

1. A deaf person, not born deaf, who has no deaf relatives, will probably not increase his liability to have deaf offspring by marrying a blood relative.

2. A deaf person, born deaf, who has no deaf relatives, will probably increase his liability to have deaf offspring by marrying a blood relative.

3. A deaf person, whether born deaf or not, who has deaf relatives, will probably increase his liability to have deaf offspring by marrying a blood relative, especially if that relative should happen to be on the deaf side of the family. For example: If his father has deaf relatives and his mother has none, he will be more likely to have deaf offspring if he marries a relative of his father than if he marries a relative of his mother.

The laws of heredity seem to indicate that a consanguineous marriage increases or intensifies in the offspring whatever peculiarities exist in the family. If a family is characterized by the large proportion of persons who enjoy good health and live to old age with unimpaired faculties, then a consanguineous marriage in such a family would probably be beneficial, by increasing and intensifying these desirable characteristics in the offspring. On the other hand, if a large proportion of the members of a family betray weakness of constitution—for example: if many of the children die in infancy, and a large proportion of the others suffer from ill health, only a few living to old age with unimpaired faculties—then a consanguineous marriage in such a family would probably be hurt-

[1] *Marriage—An Address to the Deaf*, second edition, Appendix.

ful to the offspring. A large proportion of the children would probably die in infancy, and the survivors be subject to some form of constitutional weakness.

As there are few families entirely free from constitutional defects of some kind, a prudent person would do well to avoid a consanguineous marriage in any case — not necessarily on account of deafness, but on account of the danger of weakening the constitution of the offspring. Remoteness of blood is eminently favorable to the production of vigorous offspring, and those deaf persons who have many deaf relatives would greatly diminish their liability to have deaf offspring by marrying persons very remote in blood from themselves.

Children, I think, tend to revert to the type of the common ancestors of their parents. If the nearest common ancestors are very far back in the line of ancestry, the children tend to revert to the common type of the race. Deafness and other defects would be most likely to disappear from a family by marriage with a person of different nationality. English, Irish, Scotch, German, Scandinavian and Russian blood seems to mingle beneficially with the Anglo-Saxon American, apparently producing increased vigor in the offspring.

CHAPTER VII

Summary and Conclusion

Having thus considered the more important problems which have been connected with the marriage of near kin, we have only to discuss the bearing of the conclusions thus formed upon the social aggregate, and the effect which consanguineous marriages have upon the evolution and improvement of the human species.

It has been shown that the frequency with which consanguineous marriages occur varies greatly with the physical and social environments; that such marriages are more frequent in isolated and in rural communities than in cities; and that with the increasing range of individual activity and acquaintance the relative frequency of consanguineous marriage is decreasing.

Consanguinity in the parents has no perceptible influence upon the number of children or upon their masculinity, and has little, if any, direct effect upon the physical or mental condition of the offspring.

The most important physiological effect of consanguineous marriage is to intensify any or all inheritable family characteristics or peculiarities by double inheritance. The degree of intensification probably varies with the nature of the characteristic; degenerate conditions of the mind, and of the delicate organs of special sense being the most strongly intensified.

It is probable also that in the absence of degenerative

tendencies the higher qualities of mind and body are similarly intensified by marriage between highly endowed members of the same family. Dr. Reibmayr believes that inbreeding is necessary to the higher evolution of the race: "A settled abode, natural protection from race mixture and the development of a closely inbred social class are the basic conditions of every culture period." But inbreeding must not be carried too far: "In the course of generations the ruling class begins to degenerate mentally and physically, until not only is the class destroyed, but for lack of capable leadership the people (Volk) itself is subjugated and a crossing of blood again takes place." [1]

In the breeding of animals the closest inbreeding is frequently resorted to in order to improve the stock, and many examples can be given of the closest possible inbreeding for generations without apparent detriment, but it is universally admitted that the animals selected for such inbreeding must be sound constitutionally, and free from disease. After a certain number of generations however, degeneration apparently sets in. The number of generations through which inbreeding may be carried varies with the species, and the purpose for which the animals are bred. Where they are bred primarily for their flesh, as for beef, mutton or pork, it can be pursued farther and closer than where they are bred for achievement in which a special strength is required —for instance in the breeding of race horses. This would indicate that the more delicate brain and nervous system is sooner affected than the lower bodily functions.

In man, however, freedom from hereditary taint cannot so easily be secured. Individuals cannot be selected scientifically for breeding purposes. Furthermore, the human body is more delicately constructed than that of the lower

[1] Trans. from *Inzucht und Vermischung beim Menschen*, p. 46.

animals, and the nervous system is more highly developed and specialized, so that it is reasonable to suppose that in man degeneration would set in earlier in the process of inbreeding, and that it would be impossible to breed as closely as with the lower animals. Instances are well known, however, where incestuous unions have been productive of healthy offspring, and successive generations of offspring of incestuous connection are not unknown; but, although statistics are lacking, it seems to be very often true that children of such unions are degenerate. It may be that the reason for this is that with the laws and social sentiments now prevailing in all civilized communities, only degenerates ever contract incestuous alliances. Desirable as it may be from a social point of view that this strong sentiment against incest should continue, it is not yet *proven* that even the closest blood relationship between the parents is directly injurious to the offspring. The "instinctive horror of incest" is a myth, for although a horror of incest does very properly exist in civilized, and in some tribal societies, it is purely a matter of custom and education, and not at all a universal law.

Double heredity may account for all the observed ill effects of consanguineous marriage, including the high youthful death-rate, the higher percentage of idiocy, deafness and blindness, and probably also the scrofulous and other degenerate tendencies; nevertheless, there may be in some instances a lowering of vitality which this hypothesis does not fully explain.

The tendency of inbreeding in animals, it is well known, is to fix the type, the tendency of crossing, to variation. Inbreeding then, tends to become simple repetition with no natural variations in any direction, a stagnation which in itself would indicate a comparatively low vitality. Variation and consequent selection is necessary to progress.

"Sex," according to Ward[1] "is a device for keeping up a difference of potential," and its object is not primarily reproduction, but variation.[2]

> It is organic differentiation, higher life, progress, evolution. . . . But difference of potential is a social as well as a physiological and physical principle, and perhaps we shall find the easiest transition from the physiological to the social in viewing the deteriorating effects of close inbreeding from the standpoint of the environment instead of from that of the organism. A long-continued uniform environment is more deteriorating than similarity of blood. Persons who remain for their whole lives, and their descendants after them, in the same spot, surrounded by precisely the same conditions, and intermarry with others doing the same, and who continue this for a series of generations, deteriorate mentally at least, and probably also physically, although there may not be any mixing of blood. Their whole lives, physical, mental, and moral, become fixed and monotonous, and the partners chosen for continuing the race have nothing new to add to each other's stock. There is no variation of the social monotony, and the result is socially the same as close consanguineal interbreeding. On the other hand, a case in which a man should, without knowing it, marry his own sister, after they had been long separated and living under widely different skies, would probably entail no special deterioration, and their different conditions of life would have produced practically the same effect as if they were not related.[3]

Professor Ward's idea of "difference of potential," or contrast, as essential to the highest vigor of the race as well as to

[1] *Pure Sociology*, p. 232.

[2] Pearson (*Grammar of Science*, p. 373) points out that variation does occur in asexual reproduction. But that sex is at least a powerful stimulus to variation can hardly be questioned.

[3] Ward, *op. cit.*, pp. 234-235.

that of the individual offspring, offers an alternative explanation of the observed results of consanguineous marriages, and one which does not necessarily conflict with the explanation already given. All the phenomena of intensification are simply due to a resemblance between husband and wife in particular characteristics, such as a common tendency toward deafness or toward mental weakness. This resemblance, which may or may not be the result of a common descent, renders more probable the appearance of the trait in the offspring. If the parents closely resembled each other in many respects they would be more likely to "breed true" and the children would resemble one another in their inherited traits, thus accounting for the high average of deaf-mutes to the family, observed in the Irish statistics.[1]

The theory of contrast and resemblance supplements that of intensified heredity where the resemblance is general, rather than in particular traits or characteristics. In such a case the absence of the stimulating effects of contrast might result in a lowering of vitality, which in turn would react upon the youthful death-rate.

Where then related persons differ greatly in mental and physical traits, and generally speaking, belong to different types, it is very improbable that there would be any ill effects resulting from the mere fact of consanguinity. A case in point is furnished me by a correspondent. A first cousin marriage which turned out exceedingly well was between strongly contrasted individuals; the husband was "short, stocky and dark complexioned" while the wife was "tall, slight of figure, and of exceedingly light complexion." In other cases in which the results were not so good the husband and wife bore a close resemblance to one another, physically and mentally.

[1] *Cf. supra*, p. 66.

This, however, does not agree with the results obtained by Professor Karl Pearson. Basing his conclusions on the correlation of stature between husband and wife, he believes that homogamy is a factor of fertility. Taking 205 marriages from Mr. Francis Galton's *Family Records*, Professor Pearson found the correlation between husband and wife to be .0931 ± .0467, while weighted by their fertility the correlation was .1783 ± .0210, practically doubling the intensity of assortative mating.[1] The value of these correlations, however, is impaired, as he says, by the insufficient number of observations, and by the fact that absolutely taller mothers are the more fertile.

In a subsequent investigation of from 1000 to 1050 pairs of parents of adult children, Professor Pearson found the correlation in stature to be .2804 ± .0189; of span .1989 ± .0204; and of forearm .1977 ± .0205; with cross coefficients varying from .1403 to .2023. If, as he believes, "The parents of adult children are on the average more alike than first cousins, then it follows that any evils which may flow from first cousin marriage depend not on likeness of characters, but on sameness of stock."[2]

But even if it were true, as is very improbable, that parents of adult children are more alike than first cousins, it would still be likely to follow that first cousins who married would be more alike than first cousins in general. A certain degree of resemblance is undoubtedly necessary to complete fertility: husband and wife must be physically compatible, and must both enjoy a certain degree of health and physical strength. These facts are admitted by all, but it does not follow that resemblance beyond a certain point is not in itself detrimental.

[1] *Royal Society Proceedings*, vol. 66, p. 30.

[2] *Biometrika*, vol. ii, p. 373.

Professor Pearson's own experiments in this line, however, do not give consistent results, for in correlating eye-color with fertility, heterogamy seems to increase fertility. The highest average fertility (4.57) is in those cases where the father is dark-eyed and the mother light-eyed, while the lowest is where both parents have blue-green or gray eyes.[1]

In a recent study an attempt has been made to measure the coefficient of correlation between cousins.[2] In the characteristics of health, success, temper and intelligence the coefficients ranged between .25 and .30. These values differ but little from those found to obtain for the resemblance between avuncular relatives for eye color (.265), or between grandparent and grandchild for the same characteristic (.3164).[3] Positive results were also found, with one doubtful exception, for the occurrence of insanity and tuberculosis in cousins. The writer concludes: "The grandparent, the uncle and aunt, and the cousin are on practically the same footing with regard to relationship or intensity of kinship as measured by degree of likeness of character; and it seems probable that any scientific marriage enactments would equally allow or equally forbid marriage between grandparent and grandchild, uncle and niece, aunt and nephew, and between first cousins." [4]

As we should expect the resemblance between near relatives has been found to be much greater. From a measurement of from 4000 to 4886 pairs, the average correlation of the characteristics of stature, span, forearm length and

[1] *Phil. Trans. of the Royal Society*, vol. 195 A, p. 150.

[2] Elderton and Pearson, "On the Measure of the Resemblance of First Cousins." *Eugenics Laboratory Memoirs IV*. Reviewed in *Br. Med. Journal*, Feb. 15, 1908.

[3] *Phil. Trans. of the Royal Society*, vol. 195 A, p. 106.

[4] Elderton and Pearson, *op. cit.*

eyecolor between parent and child was .4695. By similar computations and measuring the same characteristics, the fraternal correlation was found to be .508.[1] From measurements of a greater variety of characteristics in school children the mean fraternal correlation was .539.[2] In athletic power the coefficient was still higher, .72 between brothers, .75 between sisters and .49 between brothers and sisters. Measurements of mental characteristics—vivacity, assertiveness, introspection, popularity, conscientiousness, temper, ability and handwriting proved to be as easily correlated, the mean coefficients being; brothers, .52, sisters .51, brothers and sisters .52.[3]

The relative amount of degeneracy and disease among the offspring of consanguineous marriages has been enormously exaggerated, and the danger is by no means as great as is popularly supposed. Nevertheless, since it is undoubtedly true that on the average such marriages do not produce quite as healthy offspring as do non-consanguineous unions, and since public sentiment is already opposed to the marriage of cousins, it is perhaps just as well that existing laws on the subject should remain in force. From the standpoint of eugenics however, it is much more important that the marriage of persons affected with hereditary disease should be prevented. Dr. Bell has pointed out the danger of producing a deaf-mute race by the intermarriage of congenitally deaf persons,[4] and this warning

[1] Pearson and Lee, "On the Laws of Inheritance in Man," *Biometrika*, vol. ii, p. 387.

[2] *Ibid.*, p. 388.

[3] Pearson, "On the Laws of Inheritance in Man," part 2, *Biometrika*, vol. iii, p. 154.

[4] "Memoir upon the Formation of a Deaf Variety of the Human Race." *Memoirs of the National Academy of Sciences*, vol. ii, pp. 177-262.

should be made to apply to other congenital defects as well. Some states already prohibit the marriage of the mentally defective, and persons under the influence of intoxicants. Such provisions are wise, and are the most practical means of achieving eugenic ideals—by preventing the propagation of the unfit. The interests of society demand that the mentally and physically defective should not propagate their kind.

From the broader viewpoint of social evolution the problems of inbreeding or crossing of stocks merge into the discussion of the endogamous and exogamous types of society. Whatever may have been the origin of exogamy, the survival of the exogamous type in progressive societies may easily be explained on the ground of superior adaptability, variability and plasticity, which enables such societies to survive a change of environment while the more rigid structure of the endogamous clan brings about its extermination.

Inbreeding leads to caste formation and a rigid and stratified social structure, which is in the end self-destructive, and cannot survive a change of environment. The governing caste may, as Reibmayr says, favor the growth of culture, but it is usually the culture of that caste, and not of the people at large. The ruling caste is usually the result of selection of the strongest and ablest, but after it becomes a caste, the individuals are selected on account of hereditary social position and not primarily on account of ability. Now biological experiments show that although artificial selection may be carried to a point where animals will breed true to a characteristic to within 90 per cent, yet if selection is stopped, and the descendants of the selected individuals are allowed to breed freely among themselves, they will in a very few generations revert to the original type. This is what happens in a social caste, unless, as in the case of the English

aristocracy, it is continually renewed by selection of the ablest of the other classes.

The superposition and crossing of cultures, the development of secondary civilization, is necessary to social evolution in its broadest sense, and this usually involves crossing of blood as well as crossing of cultures. As a result of the unprecedented migrations of the last half-century we have in the United States the greatest variety of social types ever brought so closely together. An opportunity is offered either for the perpetuation of each racial type by inbreeding, with the prospect of an indefinite stratification of society, or for the amalgamation of all cultural and racial elements into a homogeneous whole, and the development of a race more versatile and adaptable than any the world has yet known. The general tendency will undoubtedly be toward amalgamation, but there are decided tendencies in the other direction, as for instance in the "first families of Virginia," and in that large element of the New England population which prides itself upon its exclusively Puritan ancestry, and which has inherited from its progenitors that intolerance which characterized the early settlers of New England more than the pioneers of the other colonies. The dynamic forces of modern civilization are, however, opposed to caste—the West has long ago obliterated the distinction between the Pennsylvania German and the Puritan, the Scotch-Irish and the Knickerbocker Dutch. These same dynamic forces, which have prevented the formation of caste have at the same time been diminishing the percentage of consanguineous marriage and will undoubtedly continue to operate in the same way for some time to come. And when rational laws prohibit the marriage of the diseased and the degenerate, the problem of consanguineous marriage will cease to be of vital importance.

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